A PROSPECTIVE LONGITUDINAL INVESTIGATION OF EFFECTS OF NONPARENTAL SOCIAL SUPPORT ON EARLY ADOLESCENTS' ACADEMIC ACHIEVEMENT AND ACADEMIC OUTCOMES

A Dissertation

by

CHIHARU SAKATA ALLEN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2009

Major Subject: School Psychology

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Approved by:

Chair of Committee,	Jan N. Hughes
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ABSTRACT

A Prospective Longitudinal Investigation of Effects of Nonparental Social Support on Early Adolescents' Academic Achievement and Academic Outcomes.

(August 2009)

Chiharu Sakata Allen, B.S., University of Maryland University College;

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Chair of Advisory Committee: Dr. Jan N. Hughes

The present study explored the prevalence and patterns of nonparental social support and investigated the effect of such support for 363 ethnically diverse elementary and middle school students. Using a prospective design, the study examined the effect of the availability of significant nonparental adult support as well as the effect of learning and affective support on students' academic achievement (reading and math) and academic outcomes (academic competence beliefs, classroom engagement, and school belonging), controlling for the baseline levels of functioning, cognitive ability, and demographic variables. The main and interactive effects of sex, ethnicity, and socioeconomic status were also examined. Furthermore, the study investigated the moderating effect of middle school transition on the relationship between the support variables and outcomes.

A large majority of young adolescents in the current study reported having a significant nonparental adult or natural mentor. There was no racial or ethnic difference

in the availability of natural mentors. A sex difference was found, with more female students reporting having such an adult. Extended family members were most frequently nominated as natural mentors by all students, but there was a statistically significant ethnic difference with more Hispanic and African American youths nominating extended family members than Caucasian students. Furthermore, 35% of natural adult mentors named by youth were employed in helping professions, more than in any other employment category, and nearly half of these adults were teachers.

The availability of natural mentors had statistically significant and positive effects on female students' math achievement and both male and female students' reading achievement. The provision of learning and affective support from these adults exhibited additive effects on students' teacher-reported classroom engagement and interactive effects on student-reported academic competence beliefs and school belonging. These findings were often qualified by sex and in some instances ethnicity. Furthermore, there was some support for the moderating effect of middle school transition; however, the effect was in a negative direction for students who had recently transitioned to middle school. Study limitations and implications for formal mentoring programs, extracurricular activities, teacher training and educational policy are also discussed.

DEDICATION

For our children:

Julie, Christopher, Jordan, and Jaime

I thank my God every time I think of you.

(Philippians 1:3)

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INTRODUCTION AND LITERATURE REVIEW

Academic achievement is an important construct that has both short-term and long-term influences on youth development (Planty et al., 2008). Low academic achievement is predictive of subsequent school failure, dropout, and other sequelae (Ensminger & Slusarcick, 1992). Since academic achievement becomes increasingly stable after third grade (Miles & Stipek, 2006), many researchers also examine related academic constructs that may be more susceptible to change (Connell & Wellborn, 1991; Deci & Ryan, 2000). Academic psychological constructs such as self-perceived academic competence (Anderman & Midgley, 1997; Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991), autonomy (Roeser, Eccles, & Sameroff, 1998), school belonging (Meece, Anderman, & Anderman, 2006; Roeser, Midgely, & Urdan, 1996), and academic motivation and engagement (Ryan & Patrick, 2001) have been found to impact students' academic achievement.

Risk and Resilience in Youth Development

Low socioeconomic status (SES) and racial/ethnic minority children may be particularly at risk for negative academic trajectories (Bradley & Corwyn, 2002; Egeland & Abery, 1991; Plantry et al., 2008). Some researchers also consider sex as a risk factor which exacerbates emotional and behavioral development especially in the presence of family discord (Rutter, 1987). Research suggests that risk factors tend to cluster within the individuals and that children may be impacted by multiple risk factors

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This dissertation follows the style of *School Psychology Review*.

simultaneously (Masten & Coatsworth, 1998; Wachs, 2000). Children with multiple risk factors are found to experience greater academic gap from their counterparts as they advance in grade (Entwisle & Alexander, 1992).

In an effort to identify factors that protect youth from the negative impact of adversity, the study of resiliency examines factors both within and outside the individual that increase the likelihood of positive developmental outcomes (Masten, Best, & Garmezy, 1990; Werner, 1990). Resiliency researchers have identified social support to be one of the three primary protective factors (personality features and family support being the other two). Extensive research documents the positive effects of support from parents, peers, and teachers on youth development (Bronstein, Duncan, D'Ari, Pieniaz, Fitzgerald, & Abrams, 1996; Feldlaufer, Midgley & Eccles, 1988; Furman & Buhrmester, 1985; Hamre & Pianta, 2001; Meehan, Hughes, & Cavell, 2003; Resnick et al., 1997; Ryan, 2001).

Middle School Transition

Social support during middle school transition may be particularly critical for positive youth development. It coincides with numerous biological and ecological changes as well as changes in risk and protective factors. This time of transition is marked with growth in adolescents' awareness of social relations, enhanced ability to influence their own social environment, and development of self-concept (Darling, Hamilton, & Niego, 1994). Furthermore, middle school transition may have developmental significance because it affects not only academic (Duchesne, Larose, Guay, Vitaro, & Tremblay, 2005; Wampler, Munsch, & Adams, 2002) but also

psychological (Bouchey & Harter, 2005; Chung, Elias, & Schneider, 1998; Roeser & Eccles, 1998; Wigfield & Eccles, 1994) and social (Feldlaufer et al., 1988) processes that may have long-term implications (Simmons, Burgeson, Carlton-Ford, & Blyth, 1987).

The Role of Social Support

Social support is a multidimensional construct (Barrera, 1986) that communicates to the support recipient one is cared for, loved, esteemed, and valued and belongs to a network of communication (Cobb, 1976; Cohen & Willis, 1985). Although there is some variability in the terminology, social support can be broadly categorized into tangible, informational, and emotional support (Cobb, 1976; Rhodes, Ebert, & Fischer, 1992; Rhodes, Contreras, & Mangelsdorf, 1994). Tangible support generally refers to the provision of items or goods such as money or gifts and may be referred to as instrumental support. It also refers to the provision of service or aid such as hands-on assistance with homework and help with transportation (Rhodes et al., 1992; Rhodes et al., 1994; Rosenfeld, Richman, & Bowen, 1998). Conversely, informational support refers to the provision of guidance and information pertinent to the recipient such as academic or educational information, career information, and financial information. Emotional support consists of several dimensions such as affection, intimacy, reliable alliance, and enhancement of worth (Furman & Buhrmester, 1985) as well as appraisal support and positive evaluative feedback (Malecki & Demaray, 2003) and is also referred to as esteem support or affective support.

Furman and Buhrmester (1985) hypothesized that children utilize different types of social support for different purposes and draw support from different individuals. The authors examined the support from parents, grandparents, siblings, friends, and teachers among fifth- and sixth-grade students and found that family members were the primary sources of affective support for children. Peers provided companionship and intimacy, while teachers provided instrumental guidance. Similar patterns of differential utilization of social support are reported among middle school and high school students (Darling et al., 1994; Richman, Rosenfeld, & Bowen, 1998).

Children who report receiving support from multiple sources accumulate high levels of support and may exhibit more positive outcomes and less negative outcomes than those who report limited support. Demaray and Malecki (2002a), for example, examined the associations between levels of support from parents, teachers, classmates, and close friends and a wide range of psychological, behavioral, and social functioning indicators in a large sample of school-age children and adolescents. The authors found that average to high levels of total support from all four sources were positively correlated with students' social skills, self-concept, and adaptive skills and negatively correlated with internalizing and externalizing behaviors. The authors proposed that there are critical levels of social support for positive youth development.

Cumulative high levels of support may be particularly important for academic outcomes. For example, Rosenfeld, Richaman, and Bowen (2000) compared the unique and additive effects of support from parents, teachers, and peers in a national representative sample of middle and high school students. Their results indicated that

social support from all three sources was more positively correlated with school attendance, school satisfaction, engagement, self-efficacy, and grades, as opposed to support from no, one, or two sources. Similarly, in a 2-year longitudinal study, Dubow, Tisak, Causey, and Hryshko (1991) reported that total combined social support from family, peers, and teachers positively predicted third-, fourth-, and fifth-grade students' grade point averages (GPAs), after controlling for demographic variables and previous levels of academic achievement. However, no single source of support uniquely predicted GPAs in their study.

The mechanism through which social support positively impacts youth outcomes is not fully understood. Guided by resiliency theory, the buffering model proposes that social support is particularly important in the presence of stress (Wenz-Gross, Siperstein, Untch, & Widaman, 1997) or for at-risk population (Demaray & Malecki, 2002b). Similarly, the compensatory model suggests that a protective factor counteracts adversity (Garmezy, Masten, Tellegen, 1984). The alternative model posits that social support is beneficial irrespective of the presence or absence of stress (Cohen & Willis, 1985). Gutman, Sameroff, and Cole (2003) proposed that social support from certain sources (e.g., peer support) work as protective factors that exert positive impact on high-risk students but not in low-risk students, while support from other sources (e.g., parental support) work as promotive factors that have positive and direct effects on all children. Furthermore, there has been increasing evidence for indirect effects of social support on academic achievement (Benner, Graham, & Mistry, 2008; Connell & Wellborn, 1991; Hughes & Kwok, 2007; Skinner & Belmont, 1993). For example, Hughes and Kwok

(2007) demonstrated that teacher support impacted students' behavioral engagement, which in turn exhibited positive effect on sttudents' academic achievement.

In support of the theoretical differentiation of multiple dimensions of social support, some researchers hypothesize that social support from adults has a significant role in enhancing positive youth outcomes because it provides both affective and instrumental support (Darling et al., 1994). Bouchey and Harter (2005) demonstrated that affective or appraisal support (e.g., praise for schoolwork) and instrumental support (e.g. help with schoolwork) from parents and teachers uniquely predicted middle school students' academic engagement, their perceptions of the importance of academic subjects, and their perceived academic competence, which in turn predicted their academic performance, even after accounting for the effect of their previous levels of academic achievement.

Whereas several researchers have investigated associations between multiple dimensions of social support and multiple sources of support, there is a dearth of research on the joint or interactive effect of different dimensions of social support within a given source. Most investigators examine effects either by calculating a total or average score across multiple dimensions (e.g., Jackson & Warren, 2000) and/or by source (Malecki & Demaray, 2003), or by evaluating effects separately for each support dimension (e.g., Bouchey & Harter, 2005; Hamre & Pianta, 2005), based on the hypothesis that multiple dimensions of support have additive effects on positive youth outcomes (e.g., Demaray & Malecki, 2002a). However, drawing from research on parent-child relationships (Baumrind, 1967, 1968; Maccoby & Martin, 1983; Dumas,

1996), one might expect that different dimensions of support may have interactive effects. For example, in Baumrind's classic 1967 and 1968 studies, she distinguished among authoritative and authoritarian parenting based on level of acceptance for the child's autonomy. Baumrind demonstrated that firm expectations for adolescents were more effectively communicated in the context of emotionally supportive parent-child relationships (i.e., authoritative parenting) than in less affectionate and less nurturing relationships (i.e., authoritarian parenting). Similarly, other researchers have found that the positive effects of setting clear limits and expectations for behavior are enhanced in the context of an emotionally supportive parent-child relationship (Dumas, 1996; Kochanska, 1995).

Social support from various sources, however, may not be equally available, perceived as being available, or utilized by all children. For example, Furman and Buhrmester (1992) observed sex and age differences in various provisions of social support. Girls generally report higher levels of support from all sources, except from parents, than boys (Demaray & Malecki, 2002a; Frey & Röthlisberger, 1996; Jackson & Warren, 2000). Additionally, parental support decreases while peer support increases in late adolescent years (Furman & Buhrmester, 1992; Malecki & Demaray, 2003). Regarding racial/ethnic difference, there appears to be some variation in the availability of social support; however, there is much evidence that suggests the differences are not as extensive when the family socioeconomic status is controlled for (Kim & McKenry, 1998). Furthermore, Rosenfeld and colleagues (1998) compared social support for middle school students who were identified as academically at-risk and those who were

not. They found that for academically at-risk students parents were the only major source of affective and instrumental support, while students not identified as academically at-risk reported receiving support from teachers and peers in addition to support from parents.

In summary, social support has been identified as one of the primary factors that promotes positive youth outcomes and decreases the likelihood of negative outcomes. Children and adolescents utilize social support from various sources such as parents, friends, and teachers, for various purposes. High levels of support are reported to positively influence a wide range of academic, behavioral, and social outcomes. In particular, high cumulative levels of affective and instrumental support from multiple adult sources appear to be correlated with positive academic functioning. However, social support may not be equally available, perceived as being available, or utilized by all children, and students who are identified as at-risk for academic failure may have limited social support than those who are not identified as at-risk.

The Role of Nonparental Adults

There has been an increasing interest in the role of nonparental adults as an additional source of social support for children and adolescents (Rhodes, Bogat, Roffman, Edelman, & Galasso, 2002). Darling and colleagues (1994) hypothesized that nonparental adult support may become particularly significant as children enter into adolescence. While support from parents remains important throughout adolescence and well into early adulthood, many youths begin utilizing support from unrelated adults as they explore social settings beyond home and school and as their relative independence

becomes more important. As youths' social network expands and adolescents interact with nonparental adults (Garbarino, Burston, Raber, Russell, & Crouter, 1987), some of the adults may become more "significant" (Blyth, Hill, & Thiel, 1982) or "important" (Greenberger, Chen, & Beam, 1998) and may play a role of "natural mentors" (DuBois & Silverthorn, 2005a; Rhodes et al., 2002; Zimmerman, Bingenheimer, & Notaro, 2002) to some youths. For some others, additional effort may be necessary to get connected with such adults through formal mentoring programs.

Formal Mentors

Formal mentoring programs have gained significant attention in the past two decades in the United States as a prevention intervention for youths facing multiple risk factors (DuBois & Karcher, 2005). These programs aim to protect youths identified as at-risk from a number of negative outcomes such as substance abuse and violent behaviors and promote positive outcomes such as better school attendance, academic achievement, attitude toward school, and peer and family relationships (Tierney, Grossman, & Resch, 1995). There are currently over 4,500 agencies and organizations that offer youths mentoring (Rhodes et al., 2002). Organizations such as Big Brothers Big Sisters of America specialize in providing mentoring to at-risk youths in the community, while other organizations such as the America's Promise Alliance encourage involvement of workforce, schools, faith-based organizations, and government agencies in offering mentoring to children and youth from various socioeconomic sectors. School-based mentoring programs are also rapidly increasing in number (Karcher, 2008), as some mentoring programs such as Big Brothers Big Sisters

of America are beginning to organize and monitor mentoring in a school setting (Herrera, Grossman, Kauh, Feldman, McMaken, & Jucovy, 2007).

Until recently, however, there has been limited empirical support for formal mentoring programs. In 2002, DuBois, Holloway, Valentine, and Cooper identified 55 evaluations of mentoring programs and conducted a meta-analytic review of the literature. Their study examined the overall effect of mentoring programs and identified program, mentor, and youth characteristics that were associated with more positive outcomes. The authors found that the mean effects of formal mentoring programs were modest but significant, ranging from the smallest effect on psychological outcomes (mean fixed effect of $d = .09$, mean random effect of $d = .10$) to the greatest effect reported on career and employment outcomes (mean fixed effect of $d = .19$, mean random effect of $d = .22$). The authors further discovered that organizations which provided structured activities for youth and mentors, encouraged parental involvement, and engaged mentors in ongoing training reported the greatest positive effects. As for youth characteristics, students experiencing environmental risk factors alone or those experiencing both environmental and individual risk factors benefited most from mentoring, while students experiencing individual risk factors alone (e.g., academic failure or aggression) benefited least. Finally, the authors found that programs which recruited mentors with backgrounds in helping roles or professions (e.g., teachers, counselors, doctors) reported significantly more positive outcomes than those programs that did not have such recruiting criteria.

Some of the most rigorous, methodologically sound, large scale research findings in DuBois's meta-analysis came from the Big Brothers Big Sisters of America. For example, Tierney and colleagues (1995) conducted a longitudinal study in which they randomly assigned youths into treatment and 18-month wait control groups. The youths in the wait control did not receive any other services through Big Brothers Big Sisters of America during the wait period, which allowed them to isolate the effect of the mentoring program without the confounding influence of other services, often reported inevitable in studies utilizing the wait-list control design (cf. Karcher, 2008). The 18-month wait period was not longer than the agency's usual wait period. At the time of the 18-month follow-up, the youths in the treatment group on average met with their mentors every week for approximately 12 months. Compared to the youths on the wait list, the youths with mentors were less likely to have begun using alcohol or drugs and reported more positive academic competence, school attendance, and GPAs as well as better relationships with their parents and peers.

Recently, Murray and Malmgren (2005) conducted a small randomized control study ($N = 46$), examining the effects of a program designed to improve high school students' relationships with at least one teacher. Based on the findings from school-based mentoring programs, the authors developed an intervention program in a high-poverty urban high school in collaboration with teachers. Control students met with a particular teacher on a weekly basis and received biweekly or monthly phone calls at home. These students also received increased praise and positive feedback from the teacher providing the intervention. The results indicated that the control students' GPAs

(across four subject areas, excluding the grade given by the intervention teacher) after five months of intervention were significantly higher than that of the comparison group students, after controlling for pre-intervention GPAs. This finding may indicate that a positive relationship cultivated through mentoring relationships can positively impact the students' academic achievement beyond what's gained in normative teacher-student relationships.

The brief summary above highlights the advances in the quality and quantity of research on the effect of formal mentoring programs in the past decade (Baker & Maguire, 2005). Today a set of best practices for mentoring (MENTOR/National Mentoring Partnership, 2003) guides the development and implementation of effective formal mentoring programs and assists in documenting its effectiveness.

Natural Mentors

Considerably less is known about the role of nonparental adults, other than extended family members and teachers, with whom youth develop significant relationships in natural settings. Most of the published reports are descriptive or correlational studies using cross-sectional data. Nevertheless, the review of existing literature is helpful in examining the current status of our understanding on the topic. I summarize the major findings from the existing literature below and address the limitations of the extant research.

Definition. Adults with whom youth develop significant relationships as a result of their day-to-day activities versus as a result of formal mentoring program are most often referred to as natural mentors (DuBois & Silverthorn, 2005b; Rhodes et al., 2002;

Zimmerman et al., 2002), very important persons (Greenberger et al., 1998), and various other terms that identify them as significant and/or influential nonparental adults (Blyth et al. 1982; Darling et al., 1994; Hirsch, Mickus, & Boerger, 2002). Operational definitions of such adults vary slightly among researchers but include descriptives such as nonparental adults on whom youth can depend (Greenberger et al., 1998), who believe and care deeply about youth (Rhodes et al., 1992), who have a significant influence on youth (Greenberger et al., 1998), and who have made important positive differences in the lives of youth (DuBois & Silverthorn, 2005b).

Prevalence. Research suggests nonparental social support is a normative component of youth development (Beam, Chen, & Greenberger, 2002). Beam and colleagues reported that approximately 82% of 11th graders (N = 243) had very important adults. This finding was consistent with a large scale study (*N* = 3,187) in which approximately 72% of a nationally representative sample of older adolescents and young adults (ages 18 to 26) reported having natural mentors (DuBois & Silverthorn, 2005b). Across studies, approximately half of youths with natural mentors nominate extended family members, and youth often nominate nonfamilial adults such as teachers, coaches, religious leaders, and neighbors as significant nonparental adults (DuBois & Silverthorn, 2005b; Greenberger et al. 1998; Rhodes et al., 1992; Rhodes et al., 1994; Zimmerman et al., 2002). Adults with whom youths interact in contexts such as in classrooms, youth development organizations, work and service-learning settings, and faith-based organizations may be particularly important for youths' intellectual and psychosocial well-being (Hamilton, Hamilton, Hirsch, Hughes, King & Maton, 2005).

Retrospective reports by older adolescents and young adults indicate most natural mentoring relationships were initiated in early elementary school grades (DuBois & Silverthorn, 2005b) and became significant around the age 10 (Cavell, Meehan, Heffer, & Holladay, 2002). Across studies, girls were more likely to report having significant nonparental adults than boys, and the majority of natural mentors were of the same sex and ethnicity as the youths.

There may be a decreased availability of supportive nonparental adults for youths identified as at-risk. Zimmerman and colleagues (2002), for example, found that only 52% of urban eighth graders reported having a natural mentor. Even smaller percentages (35% - 45%) are reported among parenting female adolescents and young adults from ethnic minority backgrounds (Rhodes et al., 1992; Rhodes et al., 1994). However, the findings on ethnic and racial differences remain inconsistent. In contrast to Rhodes et al.'s reports of lower access to natural mentors for ethnic minority youths, other studies found no racial or ethnic differences (Casey-Cannon, Pasch, Tschann, & Flores, 2006; Greenberger et al., 1998). It is unclear whether these inconclusive findings in the prevalence of natural mentors among ethnic minority youths are due to the differences related to the youths' ethnicity or are functions of a special characteristic of the research sample (e.g., teen mothers in Rhodes et al.'s studies).

Correlates. Several cross-sectional studies have examined the correlates of having a natural mentor. For a normative sample of 11th-grade students, having a natural mentor was not associated with adolescents' involvement in misconduct (Greenberger et al., 1998). Contrarily, for high school students who were academically

performing at an average or below average level, having a natural mentor was positively correlated with less likelihood of substance abuse, less involvement in nonviolent delinquency, and more positive attitudes toward school (Zimmerman et al., 2002). In the same study, having a natural mentor was not associated with reports of decreased depression or anxiety. For ethnic minority adolescent mothers, on the other hand, having a natural mentor was associated with lower levels of depressive symptoms (Rhodes et al., 1992) and anxiety (Rhodes et al., 1994).

Taken together, these findings suggest that correlates of having a natural mentor are multifaceted and may vary depending on a variety of factors including youths' exposure to environmental and individual risk factors. However, due to the cross-sectional nature of these studies, causal inferences cannot be drawn on the directionality of these correlates. For example, questions remain in Rhodes and colleagues' studies whether having a natural mentor helps teen mothers to become less depressed or anxious, or less depressed and anxious teen mothers possess skills that enable them to more easily build a relationship with a nonparental adult. Further investigation is needed to elucidate whether having a natural mentor increases positive outcomes and decreases negative outcomes among youths who are identified as at-risk as well as among those who are not identified as at-risk.

Outcomes. To date, an extensive search for longitudinal research on the effects of natural mentoring resulted in the identification of only one published report by DuBois and Silverthorn (2005a). The authors examined the effects of natural mentoring relationships among a large nationally-representative sample of older adolescents and

young adults in the Add Health study. Adolescents were recruited in the study when they were in grades 7 through 12 and provided baseline data. Information regarding natural mentors was collected six years later by asking the participants to recall having had an important adult at any time since they were 14 years old. Outcomes in four domains (education and work, problem behavior, psychological well-being, and physical health) were assessed at the same time. The mean age of respondents was 21.4 (*S.D.* = 1.6) at the time of natural mentor nomination and outcome measurement. The authors controlled for the effects of demographic variables and the initial levels of functioning in each domain (e.g., controlling for the GPA for educational and employment outcomes). In their analysis, having a natural mentor predicted increased positive educational and employment outcomes such as high school completion, college attendance, and employment status. Having a natural mentor did not predict decreased negative outcomes such as avoidance of risk-taking behaviors. Although it is reasonable to expect the positive outcomes associated with the mentoring might buffer children from adverse conditions, no research has tested whether this is the case.

The authors further examined the characteristics of mentoring relationships (mentor characteristics/role, frequency of contact, duration, relationship closeness) as predictors of adjustment outcomes. Regarding mentor role, having a nonfamilial natural mentor was associated with more positive educational outcomes (i.e., high school completion and college attendance) as well as increased activity levels and positive health choices than having familial natural mentors. The authors also found that youths who reported having had a natural mentor in helping professions (e.g., teachers,

counselors, religious leaders, doctors) exhibited increased likelihood of college attendance and decreasing likelihood of drug use, compared to youths who developed relationships with natural mentors informally (e.g., with neighbors, friend's parents).

Mechanisms of change. Drawing from the literature on social support (cf. Furman & Buhrmester, 1985), provisions of support are considered to be essential in promoting positive outcomes in natural mentoring relationships. Darling and colleagues (1994) argue instrumental and activity-centered components as well as affective qualities are critical ingredients for meaningful relationships between adolescents and nonparental adults. Rhodes and colleagues (1992, 1994) found that natural mentors most frequently provided youth with positive feedback, instrumental support, emotional support, and tangible support. Furthermore, greater relationship closeness (DuBois & Silverthorn, 2005a), level of emotional support (Casey-Cannon et al., 2006; Cavell et al., 2002), and perceived disapproval for misconduct (Greenberger et al., 1998) were associated with increased positive outcomes such as greater self-esteem and life satisfaction and decreased negative outcomes such as depressive symptoms and delinquent behavior. By providing various types of support, natural mentors may play roles as listeners, advisors, helpers, companions (Cavell et al., 2002), role models (Darling et al., 1994), points of identity formation (Hamilton & Darling, 1996), and sources of social capital (DuBois & Silverthorn, 2005b).

Some researchers suggest that nonparental social support is a normative component of youth development (Beam et al., 2002). High school students in Beam and colleagues' study reported that their relationships with natural mentors were

characterized by a combination of positive adult qualities and "peer-like" relations. In their study, nonparental social support was not associated with quality of parent-adolescent relationships but instead played an "additional and important" support for the adolescents (p. 322). Similarly, Hamilton and Darling (1996) suggest that natural mentors provide additive benefit to children and adolescents who are already receiving support from other sources such as parents, teachers, and peers. A competing theory posits that natural mentors are more important for youths whose support system provides little or negative support (e.g., negative parental or peer influence; Cavell et al., 2002; Zimmerman et al., 2002) and youths who are experiencing adversity (DuBois & Silverthorn, 2005a; Rhodes et al., 1992; Rhodes et al., 1994). For youths at risk, Zimmerman and colleagues (2002) suggest that natural mentors are more effective in promoting positive outcomes than reducing negative outcomes.

Additionally, the effects and functions of support from natural mentors may vary by the youth's sex, ethnic background, individual and environmental risks, and a combination of these factors. For example, Liang, Tray, Taylor, and Williams (2002) hypothesize that girls benefit more from the affective support such as empathy and empowerment, while boys benefit more from the goal-oriented, instrumental support. Casey-Cannon et al. (2006) reported that nonparental adult support was more beneficial for ethnic minority girls when they were exposed to low familial risk or stressor (e.g., parental depressive symptoms, parental substance use), while ethnic majority girls benefited more from nonparental adult support if they were experiencing high familial

risk or stressor. This differential effect may be due to ethnic or sex differences in the youths' perception of what is considered a risk factor or stressor.

Resiliency theory (Gutman et al., 2003) posits that the effects of nonparental adult support can be promotive (i.e., effective for all youths) or protective (i.e., effective in the presence of risk factor such as low SES level or ethnic minority status). The protective model may further suggest that nonparental social support has buffering effect (Demaray & Malecki, 2002b; Wenz-Gross et al., 1997) or compensatory effects (Garmezy et al., 1984) against adversity. Furthermore, social support literature on academic achievement points to indirect effect of nonparental social support on academic outcomes which, in turn, impact academic achievement (Benner et al., 2008; Connell & Wellborn, 1991; Hughes & Kwok, 2007; Skinner & Belmont, 1993). However, exact mechanisms of change in natural mentoring relationships await further exploration.

Limitations in the extant literature. As discussed above, there is limited empirical research that documents the prevalence, characteristics, and effects of natural mentoring relationships. Future research on natural mentoring relationship should include children and young adolescents, younger than the samples studied in the existing research, since significant natural relationships between youths and nonparental adults are reported to germinate in elementary and middle school years (DuBois & Silverthorn, 2005b; Cavell et al., 2002) and become significant around the age 10 (Cavell et al., 2002). Moreover, differential availability of supportive nonparental adults for ethnic minority youths has not met consensus and requires further exploration. Many cross-

sectional studies that provide descriptive information about the natural mentoring relationship have been conducted on small sample of youths (e.g., Cavell et al., 2002; Rhodes et al., 1992; Rhodes et al., 1994). A large scale study of elementary and middle school students with ethnically diverse backgrounds should further our understanding of the prevalence of natural mentors. Furthermore, future research should investigate the characteristics of relationships, exploring questions such as "with whom do youths develop significant relationships?" and "what types of support and relationships do they have with natural mentors?" Moreover, most of the research on natural mentoring relationship is cross-sectional in design. Longitudinal prospective studies are needed to increase the generalizability of findings and to allow for more causal inferences.

The single published longitudinal study investigating the effects of natural mentors on students' academic outcomes (DuBois & Silverthorn, 2005a) also had several limitations. First, their research utilized retrospective recollection by young adults about having had a mentor at any age since 14. This type of reporting method may be prone to reporter bias. For example, although their findings were consistent with natural mentors enhancing academic outcomes, it is also possible that such reports were influenced by their actual academic achievement. As the authors identified, future research should be conducted using a prospective design. Second, the authors examined two self-reported measures of academic outcomes: high school completion and college attendance. Examination of more proximal and short-term outcomes (e.g. academic achievement) using more objective measure (e.g., standardized achievement test) will be pertinent. Finally, the authors used the student's self-reported GPA as a control measure

for previous level of academic functioning when examining the effect of natural mentoring on high school completion and college attendance. Use of covariate that uses the same measure as the outcome will provide stronger statistical control.

Purpose and Significance of This Study

The purpose of the proposed study is to (a) explore the prevalence and patterns of nonparental social support perceived by elementary and middle school students, (b) examine the effect of such support on students' academic achievement and academic outcomes, and (c) investigate whether the effect of nonparental adult support differs for students who recently transitioned to middle school. Nonparental social support is expected to germinate during early adolescent years and to serve a protective role in students who have been identified as academically at-risk. This hypothesis is based upon the idea that the high levels of social support from nonparental adults may promote positive youth outcomes and decrease the impact of negative outcomes. Furthermore, learning support and affective support from nonparental adults are expected to exhibit interactive positive effects on students' academic achievement and academic outcomes. That is, drawing from research on parent-child relationships, messages nonparental adults convey to youths about the importance of doing well in school may be more effective in the context of a relationship in which the youth feels valued and accepted. In a relationship that offers affective support such as warmth and nurturance, the youth may be more likely to internalize the importance of academic achievement when learning support is provided.

This study expands extant research on the availability of natural mentors and the roles they play in early youth development in five ways. First, it investigates the availability and characteristics of social support from nonparental adults using a prospective, longitudinal design. Second, it examines the natural mentoring relationships during the youths' early adolescent years, which may provide insight into the roles of nonparental adult support during an earlier developmental period than has previously been investigated. Third, it examines the roles of natural mentors and levels of their support on standardized academic achievement and proximal and short-term academic outcomes (perceived academic competence, school membership, and behavioral engagement in classroom). Fourth, it investigates the main and interactive effects of learning support and affective support and tests the hypothesis that both types of support are necessary to deliver positive outcomes. Fifth, it explores whether the effects of natural mentors and levels of support on academic outcomes differ if students have transitioned recently to middle school.

Research Hypotheses

Consistent with existing literature on social support and roles of mentors, as well as research on parenting, the following three hypotheses were generated:

1. The availability of natural mentor will predict positive academic achievement and academic outcomes, after controlling for the influence of an ability measure, demographic factors, and previous levels of functioning.
2. For students who report having a natural mentor, learning support and affective support will exhibit additive and interactive effect on their positive academic achievement and academic outcomes, after controlling for the influence of an ability measure, demographic factors, and previous levels of functioning.

In addition to testing these two hypotheses, the main and interactive effects of sex, ethnicity, and socioeconomic status will be investigated. Furthermore, it is hypothesized that:

3. The effects of natural mentors and learning and affective support on students' academic outcomes will be moderated by whether the students are in their first year of middle school (i.e., has transitioned recently to middle school).

METHOD

Participants

Participants are 363 elementary and middle-school students, attending one of three school districts (one urban, two small cities) in southeast and central Texas. Participants were originally recruited in first grade across two sequential cohorts in 2001 and 2002 for a prospective longitudinal study examining the impact of grade retention on academic achievement. All first-grade students in the three districts were invited to participate in the study if they (a) scored below the median score on a state-approved measure of literacy in either May of kindergarten or September of first grade, (b) had not previously been retained in first grade, and (c) were not in special education (N = 1,374). A total of 1,200 parents returned written consent forms, with 784 giving positive consent (57.1% of eligible participants). Children with and without consent did not differ on age, sex, ethnicity, economic status, bilingual class placement, or literacy test scores.

Of the 784 students who participated in the original longitudinal study, 473 were recruited to participate in the current study. To be recruited, students had to either (a) be in the first cohort (N = 449) and active (i.e., living within 200 miles of the original school district) in the 2006-2007 academic year (N = 368), or (b) be in the second cohort (N = 335), active in the 2006-2007 academic year, and selected into the study based on a random probability procedure designed to equalize the percentage of participants of three major ethnic groups (African American, Hispanic, and Caucasian; N = 105). Of the 473 recruited participants, 363 (76.7%) had data on the *Nonparental Adult Interview*. These 363 students constitute the study sample. The 363 study subjects did not differ

from the remaining 421 students who initially participated in the larger study on first grade demographics and ability measures (i.e., age, sex, ethnic composition, socioeconomic status, literacy test scores, and cognitive ability). Table 1 presents select characteristics of the 363 subjects in the current study and 784 subjects in the original study.

For the 363 children 214 had complete data and 149 did not have complete data. Overall, 3.3% of data were missing. Attrition analysis revealed that students with and without complete data did not differ on demographic variables, first grade ability measures, or study variables at baseline.

The ethnic composition of the 363 participants in the present study was 26.7% African American, 36.4% Caucasian, 34.2% Hispanic, 1.7% Asian/Pacific Islander, and 1.1% other. A total of 196 students (54.0%) were males. Children's cognitive ability was measured when they were in first grade with the mean IQ of 92.68 (*S.D.* = 14.26). At baseline, children's mean age was 11.24 (*S.D.* = .59), and the grade placement of students was 14.0% third grade, 35.3% fourth grade, and 50.7% fifth grade. The students were located in 231 classes in 62 schools. Middle school placement policies vary by school district. Approximately 18.2% of students had transitioned into a middle school prior to baseline year, while approximately 44.6% of students made the transition between baseline year and outcome year. Approximately 58.6% of participants were eligible for free or reduced lunch. Approximately 86.5% of students had at least one adult in their homes who had a high school education or higher, and approximately

Table 1
Select Participant Characteristics

	Cohort 1				Cohort 2				Total Sample			
	Original Sample (N = 449)		Current Study (n = 265)		Original Sample (N = 335)		Current Study (n = 98)		Original Sample (N = 784)		Current Study (n = 363)	
Categorical Variables	*N*	%	*n*	%	*N*	%	*n*	%	*N*	%	*n*	%
Males	234	52%	148	56%	178	53%	48	49%	412	53%	196	54%
Females	215	48%	117	44%	157	47%	50	51%	372	47%	167	46%
African-American	105	23%	66	25%	77	23%	31	32%	182	23%	97	27%
Hispanic	145	32%	91	34%	122	36%	33	34%	267	34%	124	34%
Caucasian	169	38%	98	37%	124	37%	34	35%	293	37%	132	36%
Other	30	7%	10	4%	12	4%	0	0%	42	5%	10	3%
Economic Disadvantage	263	60%	154	58%	197	63%	53	60%	460	61%	207	59%
Parental Educational Level (>HS)	270	86%	187	85%	228	86%	76	89%	498	86%	263	87%
Parent Employed Full Time	275	87%	192	87%	215	80%	68	82%	490	84%	260	86%
Continuous Variables	Mean	*S.D.*	Mean	*S.D.*	Mean	*S.D.*	Mean	*S.D.*	Mean	*S.D.*	Mean	*S.D.*
Age at Year 1	11.51	.42	11.51	.39	10.47	.34	10.50	.35	11.06	.64	11.24	.59
IQ	91.92	14.79	92.47	14.11	94.29	14.30	93.23	14.70	92.91	14.62	92.68	14.26
District Literacy Z-Score	-.63	.62	-.62	.64	-.65	.55	-.65	.61	-.64	.59	-.63	.63

Note. HS = high school education. Complete data were only available for sex, ethnicity, and age. Percentages may not add up to 100 due to rounding.

85.8% of students had at least one adult in their homes who was employed full-time.

Design Overview

The baseline data for the current study was measured during the 2005-2006 school year (Year 1), while outcome data were collected during the 2006-2007 school year (Year 2). Students' assessments were conducted between November and May, with the constraint that there were at least eight months between annual assessments. Students were individually administered the measures of academic achievement as well as questionnaires assessing students' perceptions of their academic competence and school membership at Year 1 and Year 2. At Year 2, students were also individually administered an interview and questionnaire concerning a natural mentor. Teacher questionnaires assessing their perceptions of the students' behavioral engagement in classroom were administered in the spring of Year 1 and Year 2 as part of an assessment battery. Teacher questionnaires were completed by classroom teachers for elementary school students and by language arts teachers for middle school students.

Assessors were undergraduate and graduate students who were trained in test administration for approximately 20 hours prior to testing. All assessors received additional training until they were able to demonstrate their proficiency. Each test protocol was checked twice for accuracy by a school psychology doctoral student and an undergraduate research assistant.

Measures

Socio-demographic Variables

Child's sex, ethnicity, and eligibility for free or reduced lunch were obtained from school records.

Transition to Middle School Status

Information regarding grade levels and types of school (i.e., elementary, intermediate/middle) were gathered from school records. By comparing the grades and the types of schools students attended at Year 1 and Year 2, a dichotomous variable was created. Those students who were in an elementary school in Year 1 but transitioned to an intermediate or middle school at Year 2 were identified as students making middle school transition. Students who were either at an elementary school or an intermediate/middle school across both years were identified as students who did not make a transition between Year 1 and Year 2.

Cognitive Ability

Children's cognitive abilities were assessed individually with the *Universal Nonverbal Intelligence Test* (*UNIT*; Bracken & McCallum, 1998) when the students were in first grade. The *UNIT* is a comprehensive measure of general intelligence for children ages 5 to 17 years and requires no language in either administration or responses. It uses culturally and linguistically universal hand and body gestures and measures general intelligence by measuring complex memory and reasoning abilities. For the purposes of the present study, the students were administered the abbreviated version of the *UNIT*, which yields a full scale IQ. Full scale IQ scores obtained with the

abbreviated version have been demonstrated to correlate highly (r = .91) with scores obtained with the full battery, yield good test–retest and internal consistency reliabilities, and have construct validity (Bracken & McCallum, 1998; Hooper, 2003).

Academic Achievement

The *Woodcock Johnson Tests of Achievement, 3rd edition* (*WJ-III*; Woodcock, McGrew, & Mather, 2001) is an individually administered measure of academic achievement for individuals ages 2 to adulthood. For the purposes of the current study, Broad Reading W scores (Letter–Word Identification, Reading Fluency, Passage Comprehension subtests) and the Broad Math W scores (Calculations, Math Fluency, and Math Calculation Skills subtests) were used. The W scores are based on the Rasch measurement model, which incorporates information on both item difficulty and person ability and yields an equal interval scale (Woodcock et al., 2001). These characteristics of W scores allow scores obtained at Year 1 to be used as covariates for scores obtained at Year 2. Extensive research documents the reliability and construct validity of the *WJ-III* and its predecessor (Woodcock & Johnson, 1989; Woodcock et al., 2001).

For students who spoke any Spanish, the *Woodcock-Muñoz Language Test* (Woodcock & Muñoz-Sandoval, 1993) was administered to determine the child's language proficiency in English and Spanish. If the results indicated strengths in Spanish, children were administered the *Batería III Woodcock-Muñoz* (*Batería III,* Muñoz-Sandoval, Woodcock, McGrew, & Mather, 2005). The *Batería III* is the comparable Spanish version of the *WJ-III*, and the *Batería III Compuscore and Profiles*

Program (Schrank & Woodcock, 2003) yields W scores for the *Batería III* that are comparable to W scores on the *WJ-III.*

For the current study sample, correlation between baseline and outcome scores were .91 for reading and .85 for math.

Academic Competence Belief

Students' perceptions of their academic competence were measured using the abbreviated form of the *Competence Beliefs and Subjective Task Values* questionnaire (Wigfield et al., 1997). The abbreviated form consists of 10 items and taps into children's perception of their academic competence by asking them to rate how competent they feel in the areas of reading and math on a scale of 1 to 30. Example items are "if you were to list all the students in your class from the worst to the best in reading/math, where would you put yourself?" and "how good would you be at learning something new in reading/math?" The internal consistency reliabilities of these items for the study sample were .85 (Year 1) and .86 (Year 2) for competence belief in reading and .87 (Year 1) and .87 (Year 2) for competence belief in math.

Classroom Engagement

Teachers rated students' levels of classroom behavioral engagement on a 12-item scale. All items were rated using a 1-4 Likert-type scale. Items were adapted from the measures (Skinner, Zimmer-Gembeck, & Connell, 1998) of teachers' ratings of students' engagement and the student rating of engagement rephrased from the teacher's perspective. Example items include "this student tries to do very hard in school" and "this student only pays attention to things that interest him/her in class" (reverse coded).

Five of the 12 items are phrased negatively. The internal consistency reliabilities of these items for our sample were .92 for both Years 1 and 2.

School Membership

The *Psychological Sense of School Membership* (Goodenow, 1993) is an individually administered measure of perceived belonging or psychological membership in the school environment for early adolescent students. Students were asked to rate their perceived acceptance, feelings of inclusion, respect, and encouragement for participation in school on a 5-point Likert-type scale. Example items are "I feel like a real part of (name of school)", "people here know I can do good work", and "I wish I were in a different school" (reverse coded). Five of the 18 items are phrased negatively. The internal consistency reliabilities of these items for the study participants were .84 (Year 1) and .88 (Year 2).

Natural Mentoring

Students having a natural mentor were identified using the *Nonparental Adult Interview* at Year 2. The *Nonparental Adult Interview* is a semi-structured interview that has been developed specifically for the current study. Questions used in the current interview were based on extant research on natural mentors (DuBois & Silverthorn, 2005b; Greenberger et al. 1998; Rhodes et al., 1992; Rhodes et al., 1994; Zimmerman et al., 2002) and modified to fit the developmental needs of our participants. First, students were asked, "other than your parents or step-parents, do you have an adult whom you feel close to?" If the students did not understand the question or did not answer "yes" to the question, a further explanation was provided as follows: "some people have adults

whom they feel close to or depend on, like teachers, neighbors, friends' parents, and aunts and uncles. Is there someone like that for you?" Participants who responded "yes" to either of these two questions were then asked questions regarding the natural mentor's sex, ethnicity, age, occupation, relationship role, length of relationship, frequency of relationship, and information regarding the shared activities. Neither the term "mentor" nor "natural mentor" was used during the interview.

For the purpose of the present study, natural mentor's *occupation* was coded into five categories: (a) helping profession (e.g., teacher, doctor, nurse, youth director, member of clergy, social worker, etc.), (b) other professional in management or technical job (e.g., accountant, real estate agent, sales, office manager, small business owner, electrician, computer repair, etc.), (c) skilled worker job (e.g., clerical and sales workers, skilled manual workers, craftsmen, etc.), (d) non-skilled worker job (e.g., farm laborers, menial service workers, etc.), and (e) other (public-service profession, post-secondary student, etc.). *Relationship role* was grouped into four categories: (a) relatives such as aunts, uncles, cousins, and adult siblings, (b) friends of family such as neighbor, friend's parent or family member, and parent's friend, (c) school-related adults such as teachers and school counselors, and (d) extracurricular activity adults such as Scout leader, youth group leader, and baseball coach. The interrater agreement (Kappa) between two raters was .73 for occupation and .93 for relationship. Disagreements in coding between the raters were resolved through discussion.

Relationship with Natural Mentor

Students who identified a natural mentor were administered the *Nonparental Adult Relationship Inventory (Adult NRI)*. The *Adult NRI* has been developed specifically for the current study to evaluate the level of support from a natural mentor as perceived by a child. Fifteen items were adopted from the *Network of Relationship Inventory* (*NRI*; Furman & Buhrmester, 1985), which taps into emotional support and quality of relationship. These 15 items comprised six types of social support proposed by Furman and Buhrmester (3 items each assessing affection, admiration, satisfaction, and nurturance; 2 items assessing intimacy; 1 item assessing reliable alliance). Two items were created to cover additional dimensions of affective support, and five items were created to measure the students' perception on the level of learning support based on previous research (Bouchey & Harter, 2005; Malecki & Demaray, 2003). All items were rated on a 5-point Likert-type scale.

To determine the underlying dimensions of the *Adult NRI*, a cross-validation approach was applied by randomly splitting the dataset into two halves (Thompson, 2004). An exploratory factor analysis (EFA) was performed for the first half data (N = 152) using the statistical computer program, SPSS version 15 (SPSS Inc., 2007). Principal components EFA using Promax rotation was executed because factors were expected to correlate (Thompson, 2004) due to similarities in wording. For the purposes of the present study, each item had to meet the following criteria: (a) yields a factor loading of .40 or greater on one primary factor, (b) does not yield a factor loading of .30 or greater on a factor other than the primary factor, and (c) yields a factor loading that is greater by at least .15 than it is on any other factor. Two items ("how much does this adult help you with things you cannot do by yourself?" and "how much can you count on this person to be there for you?") did not meet these criteria and were excluded for the remainder of the analysis. Principal components EFA using Promax rotation on the remaining 20 items yielded three factors, accounting for 64.6% of the variance. Based on the theory as well as the review of eigenvalues and scree plot (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Thompson, 2004), the three-factor solution seemed appropriate. Analysis of these items suggested that factors represent learning support, affective support, and relationship closeness (Table 2).

Table 2
Factor Pattern Coefficients Based on EFA

Questionnaire Item	Factor		
	1	2	3
How much does this person tell you to try hard at school?†	**.90**	-.03	-.03
How much does this person tell you it is important for you to do well in school? †	**.88**	.00	-.01
How much does this person talk to you about what you learned in school? †	**.80**	-.12	.09
How much does this person expect you to make good grades at school? †	**.78**	.13	-.12
How much does this person help you with your school work? †	**.71**	-.03	.15
How good is your relationship with this adult?	-.03	**.89**	-.10
How satisfied are you with your relationship with this adult?	.01	**.86**	-.04
How much does this adult like or love you?	-.04	**.86**	.01
How much does this adult really care about you?	.08	**.84**	-.09
How much does this adult take care of you or protect you?	.01	**.82**	-.02
How much does this adult have a strong feeling of affection (love or liking) toward you?	-.07	**.82**	.12
How happy are you with the way things are between you and this adult?	-.09	**.80**	.01
How much does this person believe in you and care deeply about you? †	.21	**.72**	-.06
How much does this adult treat you like you are good at many things?	.19	**.59**	-.02
How much does this adult treat you like you are admired and respected?	.22	**.57**	.09
How sure are you that your relationship with this adult will last in spite of fights?	-.26	**.52**	.21
How much does this adult like or approve of the things you do?	.04	**.51**	.20
How much do you talk to this adult about things that you do not want others to know?	.05	-.07	**.91**
How much do you share your secrets and private feelings with this adult?	-.05	.03	**.88**
How much do you tell this adult everything?	.13	.14	**.67**

Note. Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization. †Denotes researcher-developed items.

Next, the factor structure was cross-validated by performing confirmatory factor analysis (CFA) on the second half data ($N = 151$) using Amos version 6.0 (Arbuckle, 2005). The fit of the three-factor model on the second half sample was marginally adequate [$\chi^2(167) = 348.93$, $p < .001$, CFI = .90, RMSEA = .09]. Examination of modification indices suggested correlating error terms for items where the wording was highly similar (e.g., "how much does this adult treat you like you are admired and respected?" and "how much does this adult treat you like you are good at many things?"). Based on a combination of theoretical, logical, and empirical indications, seven paths of covariance between error terms were added one at a time. Resulting fit was adequate [$\chi^2(160) = 255.75$, $p < .001$, CFI = .95, RMSEA = .06]. Examination of structure coefficients indicated that all items loaded on the appropriate factor. Table 3 provides factor loadings of the *Adult NRI* from the CFA.

To identify potential sex or ethnic group differences in factor structure, a multigroup CFA was conducted by testing the pattern of factor loadings for equivalence across sex and ethnic group membership. The multigroup analysis function of the Amos version 6.0 was used to (a) determine the factor structure of the measure across each group freely estimating the factor loadings (unconstrained model); (b) determine the factor structure of the measure across each group constraining the factor loadings to be equal (constrained model); and (c) compare the goodness-of-fit indices between the constrained and unconstrained models (Arbuckle, 2005). There were no statistically significant sex differences between the constrained and unconstrained models, indicating

Table 3
Factor Loadings Based on CFA

Construct	Loading
Learning Support	
How much does this person tell you to try hard at school?	.87
How much does this person tell you it is important for you to do well in school?	.87
How much does this person talk to you about what you learned in school?	.72
How much does this person expect you to make good grades at school?	.62
How much does this person help you with your school work?	.56
Affective Support	
How much does this adult really care about you?	.86
How good is your relationship with this adult?	.83
How satisfied are you with your relationship with this adult?	.78
How much does this adult like or love you?	.78
How much does this person believe in you and care deeply about you?	.77
How much does this adult like or approve of the things you do?	.77
How happy are you with the way things are between you and this adult?	.74
How much does this adult treat you like you are admired and respected?	.74
How much does this adult have a strong feeling of affection (love or liking) toward you?	.71
How much does this adult take care of you or protect you?	.68
How much does this adult treat you like you are good at many things?	.64
How sure are you that your relationship with this adult will last in spite of fights?	.34
Relationship Closeness	
How much do you share your secrets and private feelings with this adult?	.85
How much do you talk to this adult about things that you do not want others to know?	.81
How much do you tell this adult everything?	.80

Note. Loadings are standardized.

that the model is an equally good fit for both boys and girls: $\Delta\chi^2(17) = 22.63$ (*ns*), ΔCFI = .001, and ΔRMSEA = .05. A multigroup comparison among ethnic groups (African American, Hispanic, and Caucasian) indicated no statistically significant group differences between the constrained and unconstrained models, indicating that the model is valid for the three ethnic groups: $\Delta\chi^2(17) = 21.51$ (*ns*), ΔCFI = .001, and ΔRMSEA = .01.

Finally, the discriminant validity was assessed by examining the square root of the average variance extracted for each factor against the correlation between the two factors using the same sample as in the CFA (Fornell & Larcker, 1981). The results indicated that the square root of the average variance extracted is larger than the correlation between constructs, demonstrating discriminant validity of the factors (Table 4). Cronbach's alpha for the study sample was as follows: learning support (α = .85), affective support (α = .92), and relationship closeness (α = .85). Because learning support and affective support were the constructs of interest in the current study, only these two scales were used for the remainder of analyses.

Table 4
Construct Correlation among Learning Support, Affective Support, and Relationship Closeness

Construct	Learning Support	Affective Support	Relationship Closeness
Learning Support	.81		
Affective Support	.60**	.77	
Relationship Closeness	.59**	.57**	.86

Note. Figures on the diagonal are the square root of the average variance extracted.
**$p < .01$

Data Analysis

The current study employed descriptive and correlational analyses as well as analysis of variance (ANOVA) and multiple linear regression. Descriptive and correlational analyses were used to describe the availability and characteristics of natural mentors. Demographic differences in the availability and characteristics of natural mentors and in the levels of learning and affective support were investigated using chi square statistics and ANOVA, respectively. Two sets of multiple linear regressions were used to test the hypotheses that having a natural mentor and high levels of learning and affective support are associated with positive academic outcomes. Within each set, separate analyses were conducted for six different outcomes (i.e., reading, math, competence belief in reading, competence belief in math, behavioral engagement, and school membership). As suggested by Cohen, Cohen, West, and Aiken (2003), all continuous predictor variables were centered, while dichotomous variables (i.e., sex, socioeconomic status, and middle school transition status) were coded by dummy coding and a multiple category variable (i.e., ethnicity) was coded using a contrast coding scheme (Appendix A). For each regression analysis, preliminary analyses examined an interaction between each primary predictor (availability of natural mentors for hypothesis 1, levels of learning and affective support for hypothesis 2) and each demographic variable (i.e., sex, socioeconomic status, ethnicity). If the interaction was not statistically significant, the interaction term was removed, following the step-down hierarchical approach proposed by Aiken and West (1991). In particular, since analyses involving ethnic differences could only be conducted on the subsample of African

American, Hispanic, and Caucasian participants, if there was no statistically significant main or interactive effect of the ethnic contrasts, subsequent analyses were conducted on the overall sample in order to maintain subjects of all ethnicties. Furthermore, to test the hypothesis that middle school transition moderates the effects of availability of natural mentors and levels of support, interactions between the primary predictors and the middle school transition status were investigated.

Mplus

All multiple linear regressions were conducted in Mplus version 5.1 (Muthén & Muthén, 1998-2007) which estimates the order of predictors entered in the multiple regression equation and thus does not require the predictors to be entered in a hierarchical order. Because only a small percentage of data (approximately 3.3%) was missing and was missing at random, the missing data function of Mplus was utilized. Furthermore, the school variable was entered as the cluster variable in all analyses because students are considered to be nested within schools.

RESULTS

The results are presented in five sections. First, I will present the descriptive data on the availability of natural mentors among young adolescents. Second, I will describe the characteristics of natural mentors and their relationships. Third, I will present the results from the regression analyses that examined the hypothesis that having a natural mentor is associated with students' academic achievement, competence beliefs, behavioral classroom engagement, and school membership after controlling for their respective baseline levels, cognitive ability, and demographic factors. Fourth, I will present the results from another set of regression analyses for those students who nominated a natural mentor to test the hypothesis that high levels of learning and affective support are associated with positive academic outcomes. For each of the regression analyses, trimmed results will be presented in the absence of statistically significant interactive effects. Fifth, I will present the results from the regression analyses that examined the hypothesis that the effects of natural mentors and levels of support on students' academic outcomes are moderated by their transition to middle school.

Descriptive Analyses

Descriptive Analysis 1: Mentor Availability

Among 363 study participants, 303 students (83.7%) reported having an adult, other than their parents/guardian, with whom they feel close or upon whom they can depend. Students who reported having a natural mentor and those who did not did not differ on socioeconomic status [$\chi^2(1) = 0.00$, *ns*]. A statistically significant difference

was found in sex [$\chi^2(1) = 5.95$, $p < .05$], with more girls (88.6%) reporting having a natural mentor than boys (79.1%). For African American, Hispanic and Caucasian participants ($N = 353$), there was no statistically significant ethnic group difference [$\chi^2(2) = 5.95$, *ns*] or interaction between sex and ethnicity [$\chi^2(2) = 1.89$, *ns*; Table 5].

Table 5
Availability of Natural Mentors by Sex and Ethnicity (N = 353)

Ethnicity	Natural mentor	Sex	
		Female ($N = 162$)	Male ($N = 191$)
African American ($N = 97$)	Yes	45 (93.8%)	38 (77.6%)
	No	3 (6.2%)	11 (22.4%)
Hispanic ($N = 132$)	Yes	52 (85.2%)	56 (78.9%)
	No	9 (14.8%)	15 (21.1%)
Caucasian ($N = 124$)	Yes	46 (86.8%)	58 (81.7%)
	No	7 (13.2%)	13 (18.3%)

Descriptive Analysis 2: Characteristics of Natural Mentors

Age of natural mentors ranged from 18 to 93 (mean = 38.10, *S.D.* = 14.74). A total of 126 female participants (85.1%) and 80 male participants (51.6%) identified a same sex natural mentor ($p < .001$). Approximately 80.2% of participants named someone of his/her ethnicity, with a statistically significant ethnic difference among African American, Hispanic and Caucasian participants ($p < .05$). A further analysis revealed that more Caucasian (92.3%) youths identified a person of same ethnicity than African American (74.1%) or Hispanic (75.4%) youths [$\chi^2(1) = 8.42$, $p < .01$].

Relationship role. A total of 181 students (59.7%) reported that their natural mentors were relatives, while 80 students (26.4%) reported familial friends, 31 (10.2%) reported school-related adults (30 teachers and 1 school counselor), and 11 (3.6%) reported adults whom they've known through extracurricular activities. There was no statistically significant sex difference in the pattern of relationship role [$\chi^2(3) = 0.46$, *ns*]. A statistically significant difference was found in ethnicity [$\chi^2(6) = 24.19$, $p < .001$]. As shown in Table 6, relative to Caucasian students, African American and Hispanic students more frequently reported relatives and school-related adults and less frequently reported familial friends as natural mentors. Adults whom students have known through extracurricular activities were least frequently nominated by Hispanic participants as natural mentors.

Table 6
Relationship Role by Sex and Ethnicity

Occupation	Sex ($N = 191$)		Ethnicity ($N = 187$)		
	Girls ($n = 90$)	Boys ($n = 101$)	AA ($n = 83$)	Hispanic ($n = 108$)	Caucasian ($n = 105$)
Relative	89 (60%)	92 (59%)	56 (67%)	70 (65%)	50 (48%)
Friend of family	37 (25%)	43 (28%)	15 (18%)	21 (19%)	43 (41%)
School-related adult	16 (11%)	15 (10%)	9 (11%)	16 (15%)	6 (6%)
Extracurricular activity-related adult	6 (4%)	5 (3%)	3 (4%)	1 (0%)	6 (6%)

Note. AA = African American. Percentages may not add up to 100 due to rounding.

Natural mentor's occupation. Of 302 students who identified a natural mentor, 250 (82.8%) reported that their natural mentors were employed. Approximately 87.0% of adults identified by boys were employed, while 78.4% of adults identified by girls were employed [$\chi^2(2) = 5.83$, $p < .05$]. There was no ethnic difference in the employment status of natural mentors [$\chi^2(4) = 3.32$, *ns*].

Of 250 participants who reported that their natural mentors were employed, 191 (76.4%) students indicated they knew the natural mentors' occupation. Approximately 35.1% of adults were in helping professions (of whom 44.8% were teachers), 23.6% in non-skilled jobs, 19.9% in skilled jobs, 16.2% in management/technical professions, 5.3% in other professions such as public service professions and post-secondary students. There was no statistically significant difference by sex [$\chi^2(4) = 6.32$, *ns*] or ethnicity [$\chi^2(8) = 15.32$, *ns*] in the distribution of occupation types (Table 7).

Table 7
Natural Mentor's Occupation by Sex and Ethnicity

Occupation	Sex ($N = 191$)		Ethnicity ($N = 187$)		
	Girls ($n = 90$)	Boys ($n = 101$)	AA ($n = 51$)	Hispanic ($n = 70$)	Caucasian ($n = 66$)
Helping profession	36 (40%)	31 (31%)	21 (41%)	20 (29%)	23 (35%)
Management or technical jobs	15 (17%)	16 (16%)	6 (12%)	8 (11 %)	17 (26%)
Skilled work	20 (22%)	18 (18%)	6 (12%)	18 (26%)	14 (21%)
Non-skilled work	14 (16%)	31 (31%)	15 (29%)	21 (30%)	8 (12%)
Other	5 (6%)	5 (5%)	3 (6%)	3 (4%)	4 (6%)

Note. AA = African American. Percentages may not add up to 100 due to rounding.

Hypothesis Testing

Preliminary Analyses

In ordinary least-square multiple regression it is assumed that the residuals are (a) normally distributed with a constant variance and (b) independent (Stevens, 2002). Examination of the residuals for the study sample indicated that they were normally distributed with a constant variance, satisfying the first assumption. However, regarding the second assumption, examination of residual plots of the standardized residuals against predicted residual values (Stevens, 2002) indicated nonindependence of the residuals for our study sample. According to Cohen and colleagues (2003), nonindependence of the residuals may occur due to clustering.

Clustering. Study participants ($N = 363$) were located in 231 classes in 62 schools. Clustering at classroom level was not considered ideal because there were too many classrooms with cluster size of 1 ($n = 149$). This fact, in conjunction with reasoning that children within the same school may be more similar than children in different schools, suggested clustering at the school level would be appropriate. School-level cluster sizes ranged from 1 to 49 (*mean* = 5.85, *S.D.* = 9.46) with 31 schools with cluster size of 1. Therefore, the analyses were conducted in Mplus version 5.1 using the

school-level variable as a cluster in order to adjust for dependency in the data due to the nested nature of the study sample (Muthén & Muthén, 1998-2007).

Data were examined for outliers. Table 8 presents the skewness and kurtosis for all study participants and for those students who identified natural mentors. No scores had skewness greater than 2 standard deviations and kurtosis greater than 7 standard deviations from the mean scores, indicating there were no outliers (West, Finch, & Curran, 1995).

Finally, bivariate correlations were computed. Table 9.A and 9.B present the bivariate correlations for predictor variables for all study participants and for those who identified natural mentors, respectively. Correlations were in the patterns expected. Students' sex, cognitive ability, and socioeconomic status were related to predictors and outcomes, and were therefore used as covariates in the subsequent analyses. (Correlations including ethnic codings are presented in Appendices B and C).

Table 8

Means, Standard Deviations, Skewness, and Kurtosis of Analysis Variables

	Hypothesis 1 All students (*N*=363)					Hypothesis 2 Students with natural mentors (*N*=303)				
	N	Mean	*S.D.*	Skew-ness	Kurtosis	*N*	Mean	*S.D.*	Skew-ness	Kurtosis
Year 1										
Reading - W Score	359	494.02	20.83	-0.25	1.80	299	493.86	20.48	-0.23	2.18
(Reading - Age Score)	(359)	(94.50)	(14.00)	(0.02)	(2.28)	(299)	(94.32)	(13.54)	(-0.03)	(2.88)
Math - W Score	359	501.05	11.91	-0.45	0.97	299	501.09	11.38	-0.21	-0.10
(Read - Age Score)	(359)	(99.47)	(12.24)	(-0.22)	(1.14)	(299)	(99.55)	(11.62)	(-0.04)	(0.14)
CB Reading	356	21.17	5.95	-0.56	-0.06	297	21.28	6.02	-0.61	0.05
CB Math	356	22.32	6.10	-0.82	0.25	297	22.30	6.13	-0.85	0.38
Engagement	299	2.83	0.66	-0.30	-0.77	247	2.83	0.65	-0.31	-0.76
School Membership	357	3.91	0.64	-0.91	1.04	298	3.94	0.63	-0.91	1.11
Year 2										
Reading - W Score	355	503.55	22.22	-0.11	2.15	296	504.07	21.93	0.01	2.24
(Reading - Age Score)	(355)	(94.53)	(14.28)	(0.20)	(3.20)	(296)	(94.95)	(14.08)	(0.29)	(3.51)
Math - W Score	354	508.47	11.58	-0.56	1.45	295	508.84	11.07	-0.34	0.41
(Read - Age Score)	(354)	(98.79)	(11.81)	(-0.37)	(1.61)	(295)	(99.28)	(11.27)	(-0.22)	(0.73)
CB Reading	361	21.41	5.13	-0.32	-0.48	301	21.52	5.09	-0.26	-0.57
CB Math	361	21.99	5.31	-0.60	0.16	301	21.94	5.46	-0.62	0.17
Engagement	280	2.75	0.68	0.02	-1.14	235	2.73	0.67	0.01	-1.14
School Membership	361	3.88	0.69	-0.67	0.15	301	3.90	0.68	-0.68	0.16
Learning Support	---	---	---	---	---	303	3.62	0.96	-0.49	-0.57
Affective Support	---	---	---	---	---	303	4.19	0.73	-1.00	0.63

Note. Numbers in parentheses represent standardized age scores for Woodcock-Johnson III Tests of Achievement, presented here for interpretability. Corresponding W scores were used in all regression analyses. CB = competence belief.

Table 9
Zero-order Correlations for Predictors

A. Hypothesis 1: All participants (N = 363)

	1	2	3	4	5	6	7	8	9	10	11
1. Reading	1.00										
2. Math	**.69**	1.00									
3. CB[a] Reading	**.25**	.07	1.00								
4. CB[a] Math	.01	**.22**	**.29**	1.00							
5. Engagement	**.26**	**.33**	.06	.11	1.00						
6. School Mem[b]	.02	.03	**.32**	**.27**	.10	1.00					
7. Sex[c]	.00	.09	.01	*.13*	**-.16**	-.05	1.00				
8. SES[d]	**.28**	**.26**	.03	-.01	.11	-.07	-.03	1.00			
9. IQ	**.32**	**.37**	.02	.07	**.21**	.04	.06	**.17**	1.00		
10. Mentor[e]	-.02	.01	.04	-.01	.02	.08	*-.13*	.00	-.05	1.00	
11. Transition[f]	**.21**	**.25**	-.02	-.10	*.14*	.03	-.05	.07	*.11*	.00	1.00

B. Hypothesis 2: Participants with natural mentors (N = 303)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Reading	1.00											
2. Math	**.66**	1.00										
3. CB[a] Reading	**.25**	.06	1.00									
4. CB[a] Math	.01	**.21**	**.29**	1.00								
5. Engagement	**.26**	**.32**	.04	.03	1.00							
6. School Mem[b]	.02	.03	**.33**	**.24**	.11	1.00						
7. Sex[c]	-.01	.09	.02	*.14*	*-.16*	-.08	1.00					
8. SES[d]	**.32**	**.32**	.02	.01	*.16*	-.06	-.05	1.00				
9. IQ	**.30**	**.34**	.01	.05	**.22**	.07	.04	**.16**	1.00			
10. Learning[g]	**-.18**	**-.22**	**.17**	.07	**-.17**	**.19**	*-.14*	**-.29**	**-.18**	1.00		
11. Affect[h]	-.04	*-.12*	.10	-.04	-.09	*.12*	**-.20**	-.10	-.08	**.61**	1.00	
12. Transition[f]	**.19**	**.21**	-.03	**-.16**	.11	-.01	-.05	.10	.09	.03	-.05	1.00

Note. Variables 1 through 6 were measured at Year 1. [a]CB = competence belief; [b]School Mem. = school membership; [c]Sex: male = 1, female = 0; [d]SES: not economically disadvantaged = 1, economically disadvantaged = 0; [e]Mentor: present = 1, not present = 0; [f]Transition: 1 = recently transitioned to middle school, 0 = did not recently transition to middle school; [g]Learning = learning support; [h]Affect = affective support.
Bolded values are statistically significant at the $p < .01$ level.
Values in italics are statistically significant at the $p < .05$ level.

Hypothesis 1: Availability of Natural Mentors Predicts Positive Academic Outcomes

Six separate multiple regression were conducted to examine the hypothesis that having a natural mentor is associated with positive academic achievement, competence belief, behavioral engagement in classroom, and school membership, after controlling for the influence of baseline scores, cognitive ability, and demographic variables. Preliminary analyses of ethnic contrasts on only those subjects identified as African American, Caucasian, or Hispanic suggested no main or interactive effects on any of the academic outcomes. Therefore, following the step-down hierarchical approach (Aiken & West, 1991), the ethnic contrasts were not included in subsequent analyses in order to maintain those subjects who were identified as other than African American, Caucasian, or Hispanic. For each subsequent analysis, the school variable was used as the cluster variable, and Year 1 baseline score, cognitive ability, sex, and socioeconomic status were entered as covariates. Interactions between the predictor variable and demographic variables (sex and socioeconomic status) were also examined for all outcomes. However, in the absence of a statistically significant interaction, only the trimmed results will be presented here.

Reading. As hypothesized, the availability of natural mentors was positively associated with reading achievement ($p < .05$, Table 10). Students who reported having a natural mentor obtained higher reading scores than those who did not, after controlling for the effects of Year 1 reading scores, cognitive abilities, sex, and socioeconomic status. There was no statistically significant interaction between having a mentor and

sex or socioeconomic status, indicating natural mentors play an important role in students' reading achievement regardless of students' sex or socioeconomic status.

Table 10
Significant Multiple Regression Results Examining the Effect of Availability of Natural Mentor on Reading and Math Achievement (N = 363)

	Reading				Math			
	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.89	19.65	0.67	29.31***	.81	9.32	0.39	24.19***
IQ	.01	0.17	0.60	0.28	.08	0.94	0.36	2.58**
Sex[a]	-.03	-1.35	1.00	-1.35	.18	4.11	2.03	2.02*
SES[b]	.08	3.89	0.86	4.51***	.05	1.31	0.74	1.77
Mentor[c]	.06	3.46	1.59	2.18*	.17	5.18	1.77	2.93**
Mentor × Sex	---	---	---	---	-.20	-4.63	2.09	-2.22*
R-Square	.84				.75			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline scores for corresponding outcome. All continuous predictor variables were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0; [c]Mentor: present = 1, not present = 0.
*$p < .05$, **$p < .01$, ***$p < .001$.

Math. As predicted, those students who reported having natural mentors also exhibited higher math achievement scores than those who did not ($p < .05$, Table 10). The interaction between the availability of natural mentors and sex was statistically significant ($p < .05$), indicating the effects of natural mentors differed for boys and girls. Follow-up analyses revealed that the effect of natural mentors on students' math achievement was statistically significant and positive for female students ($p < .05$) but not statistically significant for male students (Table 11).

Table 11
Summary of Multiple Regression Analyses by Sex, Examining the Effect of Availability of Natural Mentor on Math Achievement

	Boys (n = 196)				Girls (n = 167)			
	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.81	9.53	0.53	18.09***	.81	9.06	0.41	22.38***
IQ	.08	1.00	0.50	2.01*	.08	0.90	0.44	2.05*
SES[a]	.05	1.33	1.04	1.28	.05	1.19	0.78	1.52
Mentor[b]	.02	0.56	1.17	0.48	.15	5.22	1.79	2.91**
R-Square	.73				.77			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline math score. [a]SES: not economically disadvantaged = 1, economically disadvantaged = 0; [b]Mentor: present = 1, not present = 0.
*p < .05, **p < .01, ***p < .001.

Competence beliefs and classroom engagement. Contrary to the hypothesis, having a natural mentor did not predict positive change in the student-reported academic outcomes. As depicted in Table 12, there was no statistically significant main or interactive effect on students' competence beliefs in either reading or math. Furthermore, no statistically significant main or interactive effect was found for teacher-rated students' behavioral engagement in classroom (Table 13).

Table 12
Summary of Multiple Regression Analyses Examining the Effect of Availability of Natural Mentor on Competence Beliefs (N = 363)

	Competence Belief - Reading				Competence Belief - Math			
	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.37	1.91	0.24	7.88***	.39	2.01	0.31	6.67***
IQ	.00	0.01	0.28	0.03	.04	0.23	0.28	0.83
Sex[a]	.07	0.71	0.58	1.22	.11	1.14	0.54	2.11*
SES[b]	-.04	-0.37	0.52	-0.72	-.02	-0.22	0.67	-0.32
Mentor[c]	.04	0.57	0.76	0.75	.00	0.01	0.71	0.01
R-Square	.15				.18			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline scores for corresponding outcome. All continuous predictor variables were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0; [c]Mentor: present = 1, not present = 0.
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 13
Summary of Multiple Regression Analyses Examining the Effect of Availability of Natural Mentor on Engagement and School Membership (N = 363)

	Classroom Engagement				School Membership			
	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.57	0.39	0.04	10.66***	.34	0.23	0.04	6.89***
IQ	-.01	-0.01	0.03	-0.20	-.03	-0.02	0.03	-0.63
Sex[a]	-.08	-0.11	0.06	-1.70	-.04	-0.05	0.08	-0.65
SES[b]	.07	0.10	0.08	1.29	-.28	-0.41	0.14	-2.86**
Mentor[c]	-.06	-0.12	0.09	-1.32	.18	0.34	0.14	2.34*
Mentor × SES	---	---	---	---	.28	0.38	0.15	2.51*
R-Square	.36				.14			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline scores for corresponding outcome. All continuous predictor variables were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0; [c]Mentor: present = 1, not present = 0.
*$p < .05$, **$p < .01$, ***$p < .001$.

School membership. A statistically significant interactive effect was observed between the availability of natural mentors and students' socioeconomic status on school membership ($p < .05$, Table 13). However, separate regression analyses for students who were identified as economically disadvantaged and those who were identified as not economically disadvantaged revealed a statistically nonsignificant effect of having a mentor for both groups (Table 14). These results indicate that the two groups differed in the directions of the effects of natural mentors; i.e., having a natural mentor had a slightly positive but statistically nonsignificant effect on students who were identified as not economically disadvantaged, while it had a slightly negative and statistically nonsignificant effect on students who were identified as economically disadvantaged.

Table 14
Summary of Multiple Regression Analyses by SES, Examining the Effect of Availability of Natural Mentor on School Membership

	Economically Disadvantaged (n = 221)				Not Economically Disadvantaged (n = 126)			
	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.28	0.18	0.06	3.09***	.46	0.34	0.04	8.30***
IQ	-.03	-0.02	0.05	-0.39	.01	0.01	0.06	0.12
Sex[a]	-.01	0.01	0.11	0.11	-.12	-0.18	0.11	-1.66
Mentor[b]	-.02	-0.04	0.09	-0.44	.14	0.27	0.15	1.74
R-Square	.08				.28			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline school membership score. All continuous predictor variables were entered as z-scores. [a]Sex: male = 1, female = 0; [b]Mentor: present = 1, not present = 0.
*$p < .05$, **$p < .01$, ***$p < .001$.

Hypothesis 2: High Levels of Learning and Affective Support Predict Positive Academic Outcomes

To examine the hypothesis that higher levels of learning and affective support predicted positive academic outcomes, a second set of multiple regression analyses were conducted for each academic outcome. Predictor variables were learning support, affective support, and learning × affective support. Year 1 baseline score, cognitive ability, sex, and socioeconomic status were entered as covariates, and the school variable was used as a cluster variable. Interactions between the predictor variable and demographic variables were also examined for all outcomes. All analyses investigating interactive effects followed the step-down hierarchical approach (Aiken & West, 1991). Only the trimmed results will be presented.

As with hypothesis 1, preliminary analyses were conducted to investigate the main and interactive effects of ethnic contrasts on only those subjects identified as African American, Caucasian, or Hispanic. No statistically significant main or interactive effects were observed for five of the six outcomes: reading achievement, math achievement, competence belief in math, classroom engagement, and school membership. Therefore, for these five outcomes, the ethnic contrasts were not included as covariates in the subsequent analyses. For competence belief in reading, statistically significant interactive effects were observed between the levels of learning and affective support and two demographic variables (sex and ethnic contrasts). Ethnic contrasts × sex did not indicate a statistically significant three-way interaction with levels of

support; therefore, sex and ethnic differences were examined in two separate regression analyses for competence belief in reading.

Reading. For students who reported having a natural mentor, a statistically significant three-way interaction was observed between learning support, affective support, and students' sex on their reading achievement (Table 15). Contrary to the original hypothesis that proposed a high level of support would be associated with positive academic outcome, a follow-up analysis revealed a statistically significant negative interaction of learning and affective support on reading achievement for male students. As can be seen in Figure 1, for male students, high levels of both learning and affective support led to lower reading scores than what was predicted by the additive effect of learning and affective support. Conversely, male students with low learning support exhibited relatively high reading scores, regardless of the level of affective support. Similar patterns were observed for male students with low affective support; their reading scores were relatively high regardless of the level of learning support. These effects were not observed for female students.

Table 15

Significant Multiple Regression Results for Three-Way Interaction between Learning Support × Affective Support × Sex on Reading Achievement

	All with Natural Mentor (N = 303)				Boys (n = 155)				Girls (n = 148)			
	β	b	*SE*	t Test	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.90	19.60	0.54	36.50***	.86	18.83	0.87	21.78***	.93	20.24	0.78	25.88***
IQ	-.03	-0.64	0.70	-0.93	-.05	-1.11	0.87	-1.28	-.01	-0.29	0.71	-0.41
Sex[a]	-.01	-0.56	1.24	-0.45	---	---	---	---	---	---	---	---
SES[b]	.06	2.93	0.89	3.29**	.09	4.14	1.40	2.95**	.05	2.04	1.34	1.52
Learning Support	-.00	-0.07	1.29	-0.05	-.09	-1.78	0.78	-2.27*	.00	0.02	1.25	0.02
Affective Support	.04	0.78	1.13	0.69	-.08	-1.48	0.72	-2.05*	.03	0.71	1.09	0.65
Learning × Affect	.02	0.50	0.96	0.52	-.11	-1.85	0.55	-3.40***	.02	0.50	0.98	0.51
Learning × Sex[a]	-.06	-1.68	1.75	-0.96	---	---	---	---	---	---	---	---
Affective × Sex[a]	-.08	-2.19	1.51	-1.45	---	---	---	---	---	---	---	---
Learning × Affect × Sex[a]	-.11	-2.27	1.14	-1.99*	---	---	---	---	---	---	---	---
R-Square	.86				.85				.87			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline Reading score. All continuous predictor variables were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0; [c]Learning = learning support; [d]Affective = affective support.

*p < .05, **p < .01, ***p < .001.

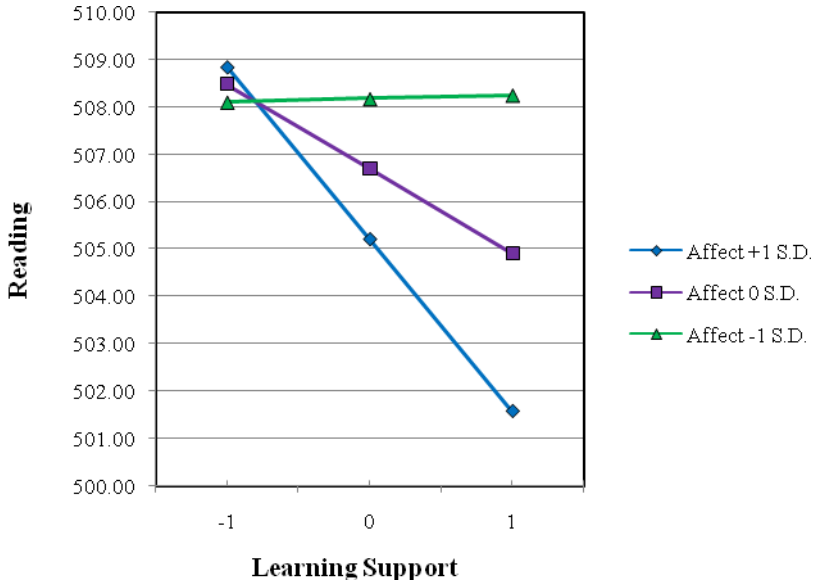

Figure 1. Interactive effect of learning support × affective support on male students' reading achievement.

Math. For math achievement, a preliminary analysis revealed a statistically significant interactive effect between learning support and sex ($p < .05$, Table 16). However, the results of a follow-up analysis indicated that although boys and girls differed in the direction of the effects of learning support (slightly positive for girls and slightly negative for boys), the effect was not statistically significant for either male or female students.

Table 16
Significant Multiple Regression Results for Interaction between Levels of Support × Sex on Math Achievement

	All with Natural Mentor ($N = 303$)				Boys ($n = 155$)				Girls ($n = 148$)			
	β	b	*SE*	t Test	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.82	9.00	0.44	20.69***	.79	8.95	0.63	14.25***	.84	9.00	0.49	18.46***
IQ	.07	0.79	0.42	1.89	.07	0.86	0.58	1.48	.07	0.72	0.49	1.47
Sex[a]	-.03	-0.68	0.82	-0.83	---	---	---	---	---	---	---	---
SES[b]	.05	1.08	0.84	1.29	.06	1.54	1.37	1.12	.03	0.69	0.79	0.87
Learning[c]	.04	0.49	0.42	1.17	-.07	-0.73	0.57	-1.28	.04	0.40	0.46	0.88
Affective[d]	-.06	-0.63	0.51	-1.24	.01	0.11	0.37	0.31	.05	-0.61	0.52	-1.16
Learn[c] × Sex[a]	-.09	-1.30	0.59	-2.20*	---	---	---	---	---	---	---	---
Aff [d] × Sex[a]	.06	0.77	0.59	1.32	---	---	---	---	---	---	---	---
R-Square	.75				.74				.76			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline math score. All continuous predictors were entered as z-scores.
[a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0.
[c]Learn(ing) = learning support; [d]Aff(ective) = affective support.
*$p < .05$, **$p < .01$, ***$p < .001$.

Competence belief in reading. Preliminary analyses revealed statistically significant interactive effects involving learning and affective support and two demographic variables (sex and ethnic contrasts) on competence belief in reading. Ethnic contrasts × sex did not exhibit a statistically significant three-way interaction with levels of support; therefore, sex and ethnic differences were examined separately in subsequent analyses. Analyses involving sex differences were conducted on all subjects who named a natural mentor (n = 303), while analyses involving ethnic differences were conducted on African American, Hispanic, and Caucasian subjects (n = 296).

In examining the sex differences, a statistically significant three-way interaction was found between sex, learning support, and affective support (Table 17). A follow-up analysis revealed that for female students, there was a statistically significant positive interaction between learning and affective support. These results suggest, for female students, high levels of both learning and affective support led to higher competence belief in reading than the sum of learning and affective support would predict. As can be seen in Figure 2, when female students received higher levels of affective support, higher learning support levels were significantly associated with higher competence belief in reading. These effects were not observed for male students.

Table 17
Significant Multiple Regression Results for Three-Way Interaction between Learning Support × Affective Support × Sex on Competence Belief in Reading

	All with Natural Mentor (N = 303)				Boys (n = 155)				Girls (n = 148)			
	β	b	*SE*	t Test	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.90	1.89	0.24	8.03***	.30	1.44	0.39	3.66***	.42	2.27	0.35	6.54***
IQ	-.03	0.00	0.23	0.00	-.10	-0.46	0.23	-2.03*	.07	0.40	0.31	1.31
Sex[a]	-.01	1.82	0.71	2.58*	---	---	---	---	---	---	---	---
SES[b]	-.06	-0.01	0.46	-0.03	.07	0.67	0.73	0.91	-.06	-0.66	0.70	-0.94
Learning[c]	-.00	0.14	0.86	0.16	.02	0.11	0.38	0.28	.01	0.05	0.77	0.07
Affective[d]	.04	1.56	0.71	2.21*	.15	0.64	0.60	1.07	.23	1.56	0.72	2.18*
Learn[c] × Aff[d]	.02	1.47	0.60	2.45*	.01	0.04	0.37	0.10	.17	1.48	0.63	2.35*
Learn[c] × Sex[a]	-.06	-0.14	0.97	-0.15	---	---	---	---	---	---	---	---
Aff [d] × Sex[a]	-.08	-0.90	0.92	-0.98	---	---	---	---	---	---	---	---
Le[c]×Af[d]×Sex[a]	-.11	-1.44	0.62	-2.33*	---	---	---	---	---	---	---	---
R-Square	.22				.14				.29			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline score for competence belief in reading. All continuous predictors were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0. [c]Le(arning) = learning support; [d]Af(fective) = affective support.
*p < .05, **p < .01, ***p < .001.

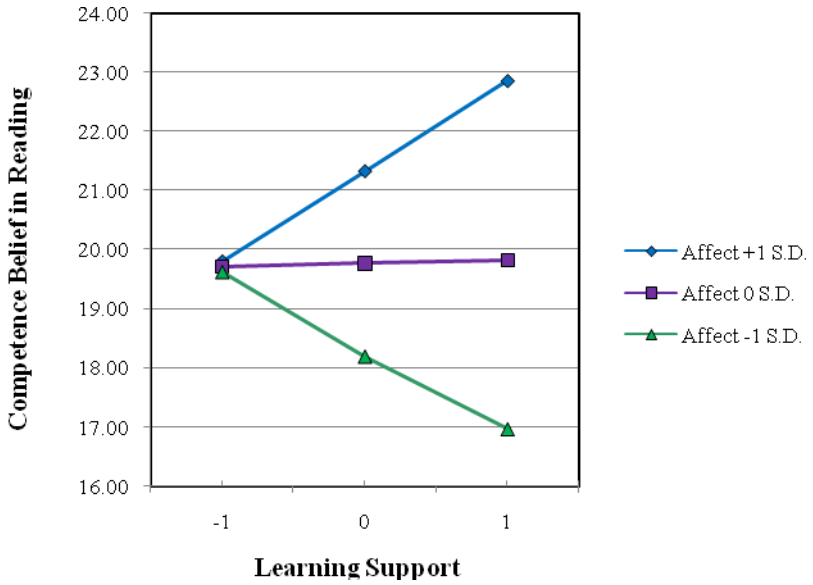

Figure 2. Interactive effect of learning support × affective support on female students' competence belief in reading.

Ethnic differences were examined on the subsample of African American, Hispanic, and Caucasian subjects (n = 296). A statistically significant interaction was observed between learning support and both ethnic contrasts ($p < .01$ for both, Table 18). Three-way interactions between learning support, affective support, and ethnic contrasts were not statistically significant. Follow-up analyses conducted separately for each ethnic group revealed that there were statistically significant positive effects of learning support on Hispanic students' competence belief in reading ($p < .001$). No statistically significant effect of either learning or affective support was observed for African American students. For Caucasian students, learning support had a statistically

Table 18

Significant Multiple Regression Results for Interaction between Learning Support × Ethnic Contrasts on Competence Belief in Reading

	All Ethnic Contrasts (N = 296)				Hispanic (n = 108)				Caucasian (n = 105)				African American (n = 83)			
	β	b	*SE*	t Test	β	b	*SE*	t Test	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.37	1.88	0.21	8.83***	.21	1.22	0.40	3.06***	.48	2.26	0.41	5.50***	.39	1.96	0.42	4.63**
IQ	-.01	-0.06	0.22	-0.25	-.07	-0.45	0.48	-0.94	.12	0.60	0.28	2.13*	-.04	-0.21	-0.35	-0.60
Sex[a]	.10	1.02	0.62	1.65	.01	0.11	1.14	0.09	.24	2.38	1.08	2.21*	.06	0.56	1.05	0.53
SES[b]	-.06	-0.61	0.52	-1.16	-.05	-0.65	1.12	-0.58	.01	0.09	0.70	0.13	-.17	-2.76	0.82	-3.38**
Ethnic C1[c]	.06	0.20	0.20	1.00	---	---	---	---	---	---	---	---	---	---	---	---
Ethnic C2[d]	-04	-0.28	0.24	-1.18	---	---	---	---	---	---	---	---	---	---	---	---
Learning[e]	.09	0.46	0.29	1.59	.39	2.41	0.66	3.65***	-.12	-0.59	0.27	-2.15*	-.01	-0.06	0.62	-0.10
Affective[f]	.14	0.70	0.42	1.67	-.06	-0.33	0.90	-0.37	.25	1.19	0.47	2.54*	.15	0.85	0.86	1.00
Lrn[e] × C1[c]	-.18	-0.64	0.22	-2.93**	---	---	---	---	---	---	---	---	---	---	---	---
Lrn[e] × C2[d]	.18	1.24	0.46	2.73**	---	---	---	---	---	---	---	---	---	---	---	---
Aff[f] × C1[c]	.07	0.25	0.31	0.80	---	---	---	---	---	---	---	---	---	---	---	---
Aff[f] × C2[d]	-.09	-0.59	0.53	-1.11	---	---	---	---	---	---	---	---	---	---	---	---
R-Square	.23				.19				.36				.24			

Note. The analyses examining ethnic differences were conducted on a subsample consisting only Hispanic, Caucasian, and African American subjects. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline score for competence belief in reading. All continuous predictor variables were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0. [c]Ethnic C1: African American & Hispanic = -1, Caucasian = 2; [d]Ethnic C2: African American = -1, Hispanic = 1, Caucasian = 0. [e]L(ea)rn(ing) = learning support; [f]Aff(ective) = affective support.

*p < .05, **p < .01, ***p < .001.

significant but negative effect ($p < .05$), while affective support had a statistically significant and positive effect ($p < .05$).

Suspecting that this anomalous negative impact of learning support was due to suppression, bivariate correlations were computed for the Caucasian students only (Table 19). Suppressor variable is a predictor variable that has a zero or close to zero correlation with the outcome variable but improves prediction by being correlated with other predictors in a regression equation (Tzelgov & Henik, 1991). According to Cohen and colleagues (2003),

> Suppression is present when either r_{Y1} or r_{Y2} is less than the product of the other with r_{12} … In this case the partialed coefficients of X_1 and X_2 will be larger in value than the zero-order coefficients and one of the partialed (direct effect) coefficients may become negative (p. 77).

Table 19
Correlations between Competence Belief in Reading, Learning Support, and Affective Support for Caucasian Students (n = 105)

	Y	X_1	X_2	Product with r_{12}
Y. CB Reading[a]	1.000			
X_1. Learning Support	.013	1.000		0.006
X_2. Affective Support	.185	.507**	1.000	0.094

Note. [a]CB Reading = competence belief in reading.
**$p < .01$.

As can be seen in Table 19, r_{Y1} (i.e., correlation between learning support and competence belief in reading) is .013, while the product of the other (i.e., r_{Y2}, correlation

between affective support and competence belief in reading) with the r_{12} (i.e., correlation between learning support and affective support) is .094; thus $r_{Y1} < r_{Y2} \times r_{12}$. It is also observed that the absolute values of partialed coefficients of X_1 and X_2 (.12 and .25, respectively) are larger than the zero-order coefficients (.013 and .185, respectively) and one of the partialed coefficients is negative (-.12 for learning support). Furthermore, an examination of separate regression models for learning support and affective support revealed a statistically nonsignificant but positive partialed coefficient for learning support (Table 20). Taken together, the partialed coefficient in an interaction model may be expressed as negative as a function of suppression effect.

Table 20
Summary of Multiple Regression Analyses Examining the Effect of Learning Support and Affective Support on Competence Belief in Reading for Caucasian Students (n = 105)

	Learning Support				Affective Support			
	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.48	2.24	0.40	5.65***	.47	2.20	0.40	5.49***
IQ	.16	0.77	0.31	2.46*	.14	0.68	0.33	2.08*
Sex[a]	.23	2.24	1.26	1.79	-.25	2.47	1.08	2.28*
SES[b]	-.01	-0.11	0.58	-0.18	.03	0.31	0.73	0.42*
Learning Support	.01	0.03	0.27	0.09	---	---	---	---
Affective Support	---	---	---	---	.19	0.92	0.44	2.11*
R-Square	.31				.35			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline score for competence belief in reading. All continuous predictor variables were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0.
*$p < .05$, **$p < .01$, ***$p < .001$.

Competence belief in math. For competence belief in math, a statistically significant three-way interaction was observed between learning support, affective support, and sex ($p < .05$, Table 21). For female students, there was a statistically significant positive interaction between learning support × affective support ($p < .05$), even though neither learning nor affective support singularly exhibited statistically significant effect on competence belief in math. These results suggest that for female

Table 21
Significant Multiple Regression Results for Three-Way Interaction between Learning Support × Affective Support × Sex on Competence Belief in Math

	All with Natural Mentor ($N = 303$)				Boys ($n = 155$)				Girls ($n = 148$)			
	β	b	*SE*	t Test	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.43	2.34	0.37	6.37***	.39	2.11	0.54	3.90***	.48	2.60	0.32	8.07***
IQ	.06	0.31	0.30	1.03	-.04	-0.22	0.37	-0.58	.16	0.87	0.40	2.17*
Sex[a]	.17	1.88	0.62	3.01**	---	---	---	---		---	---	---
SES[b]	.00	0.03	0.74	0.05	.06	0.65	1.04	0.62	-.05	-0.54	0.91	-0.59
Learning[c]	.10	0.55	0.65	0.86	.02	0.08	0.41	0.19	.08	0.52	0.67	0.77
Affective[d]	.10	0.54	0.77	0.70	.15	0.68	0.54	1.27	.09	0.62	0.78	0.79
Lrn[c] × Aff[d]	.32	1.65	0.65	2.53*	.09	0.34	0.32	1.04	.19	1.63	0.67	2.45*
Lrn[c] × Sex[a]	-.07	-0.51	0.77	-0.66	---	---	---	---	---	---	---	---
Aff[d] × Sex[a]	.03	0.18	0.78	0.24	---	---	---	---	---	---	---	---
Lrn[c]×Af[d]×Sex[a]	-.24	-1.28	0.58	-2.21*	---	---	---	---	---	---	---	---
R-Square	.25				.18				.31			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline score for competence belief in math. All continuous predictors were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0. [c]L(ea)rn(ing) = learning support; [d]Af(fective) = affective support. *$p < .05$, **$p < .01$, ***$p < .001$.

students' competence belief in math, highs level of both learning support and affective support are needed (Figure 3). For male students, there was no statistically significant main or interactive effect of learning or affective support.

Additionally, a statistically significant interaction was observed between learning × affective support and socioeconomic status ($p < .05$); however, a follow-up analysis revealed no statistically significant main or interactive effect for either group (economically disadvantaged vs. not economically disadvantaged) on students' competence belief in math.

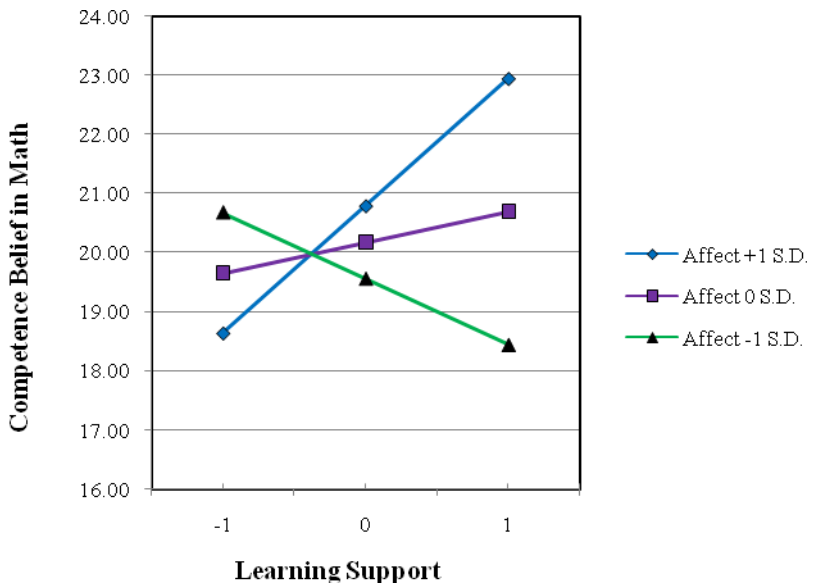

Figure 3. Interactive effect of learning support × affective support on female students' competence belief in math.

Classroom engagement. There were statistically significant interactions between students' sex and learning support ($p < .05$) and between sex and affective support ($p <$

.01) on teacher-rated classroom engagement (Table 22). An interaction between learning support and affective support was not statistically significant. Follow-up analyses conducted separately for males and females indicated no statically significant effect of learning or affective support on classroom engagement for male students. For female students, there was a statistically significant positive effect of affective support ($p < .001$) and a statistically significant negative effect of learning support ($p < .01$). Neither an examination of bivariate correlations (Table 23) nor a comparison of partialed coefficients of learning and affective support with the zero-order coefficients provided support for suppression as a possible explanation (Cohen et al., 2003) for this anomalous negative impact of learning support for female students.

Table 22
Significant Multiple Regression Results for Interaction between Levels of Support × Sex on Classroom Engagement

	All with Natural Mentor ($N = 303$)				Boys ($n = 155$)				Girls ($n = 148$)			
	β	b	*SE*	t Test	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.57	0.38	0.04	9.32***	.48	0.32	0.06	5.63***	.63	0.43	0.07	6.32***
IQ	-.06	-0.04	0.03	-1.25	.00	0.00	0.04	0.02	-.13	-0.09	0.05	-1.68
Sex[a]	-.07	-0.09	0.07	-1.26	---	---	---	---	---	---	---	---
SES[b]	.05	0.08	0.08	0.92	.13	0.17	0.11	1.60	-.01	-0.02	0.10	-0.18
Learning[c]	-.21	-0.14	0.05	-2.76**	.04	0.03	0.07	0.40	-.23	-0.17	0.05	-3.15**
Affective[d]	.29	0.20	0.05	3.96***	-.02	-0.01	0.05	-0.17	.25	0.21	0.06	3.87***
Lrn[c] × Sex[a]	.18	0.16	0.07	2.23*	---	---	---	---	---	---	---	---
Aff[d] × Sex[a]	-.25	-0.20	0.07	-2.80**	---	---	---	---	---	---	---	---
R-Square			.36				.27				.43	

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = engagement score at baseline. All continuous predictors were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0. [c]L(ea)rn(ing) = learning support; [d]Aff(ective) = affective support.
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 23
Correlations between Classroom Engagement, Learning Support, and Affective Support for Female Students (*n* = 148)

	Y	X_1	X_2	Product with r_{12}
Y. Engagement	1.000			
X_1. Learning Support	-.133	1.000		-0.077
X_2. Affective Support	.080	.577**	1.000	0.046

Note. **$p < .01$.

School membership. For students' perceived school membership, there was a statistically significant interaction between affective support and learning support ($p < .01$, Table 24). As can be seen in Figure 4, higher levels of learning support and higher levels of affective support were significantly associated with higher levels of school membership. On the other hand, when students received low level of learning support, level of school membership differed little across the levels of affective support. There was no statistically significant interaction between levels of support and sex, ethnicity, or socioeconomic status, indicating learning × affective support are important for students' school membership regardless of their sex, ethnicity, or socioeconomic status.

Table 24
Significant Multiple Regression Results for Interaction between Learning Support × Affective Support on School Membership (N = 303)

	School Membership			
	β	b	*SE*	t Test
Year 1	.35	0.24	0.04	6.47***
IQ	.02	0.01	0.04	0.30
Sex[a]	.00	0.00	0.09	0.05
SES[b]	.03	0.04	0.07	0.54
Learning Support	.08	0.05	0.05	0.96
Affective Support	.21	0.14	0.05	3.01**
Learning × Affective	.15	0.10	0.03	3.07**
R-Square		.20		

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline score for school membership. All continuous predictors were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0.
*$p < .05$, **$p < .01$, ***$p < .001$.

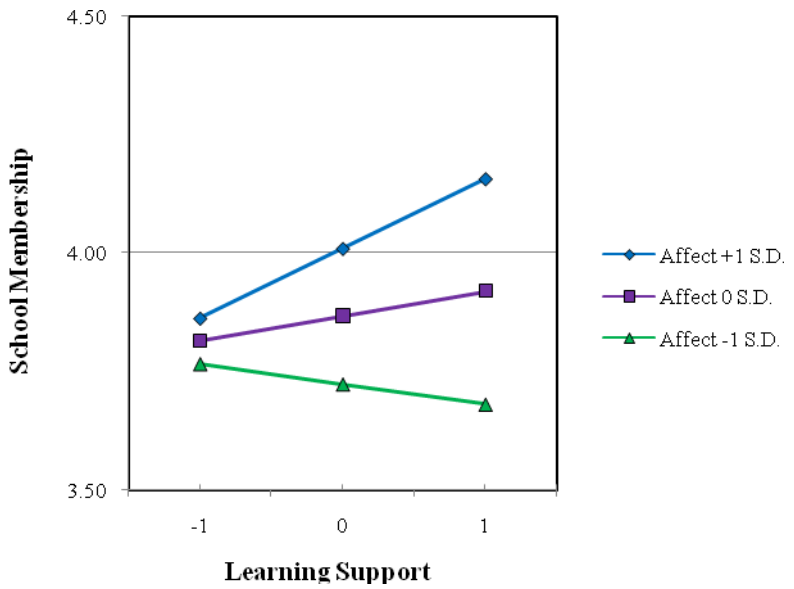

Figure 4. Interactive effect of learning support × affective support on school membership.

Hypothesis 3: Transition to Middle School Will Moderate the Effects of the Availability of Natural Mentors and Their Learning and Affective Support

It had originally been hypothesized that the effects of the availability of natural mentors and learning and affective support will have more impact on students who have transitioned recently to middle school than those students who did not make this transition. Interactions between the predictor variables (availability of natural mentors, learning and affective support, learning × affective support) were examined to test this hypothesis. As was in the previous analyses, interactions between the predictor variable and demographic variables were examined for all outcomes, following the step-down hierarchical approach (Aiken & West, 1991) and only the trimmed results will be presented. Year 1 baseline score, cognitive ability, sex, and socioeconomic status were entered as covariates, and the school variable was used as a cluster variable. Transition to middle school was defined as making the transition from elementary school to middle school between Year 1 and Year 2. Approximately 44.6% of participants made this transition.

Availability of natural mentors. A statistically significant interaction between the availability of natural mentors and middle school transition was found on teacher-rated classroom engagement ($p < .05$, Table 25). Contrary to the original hypothesis, the availability of natural mentors predicted a negative change ($p < .01$) in the levels of behavioral engagement for students who made the transition to middle school between Year 1 and Year 2. These results suggest that students with natural mentors became less engaged in classroom following transition to middle school. There were no statistically

significant interaction between the availability of natural mentors and middle school transition on any of the other academic outcomes.

Table 25
Significant Multiple Regression Results for Interaction between the Availability of Natural Mentors × Middle School Transition on Classroom Engagement

	All (N = 363)				Transitioned to MS[e] (n = 162)				Did Not Transition to MS[e] (n = 201)			
	β	b	*SE*	t Test	β	b	*SE*	t Test	β	b	*SE*	t Test
Year 1	.57	0.39	0.04	11.02***	.56	0.40	0.06	6.43***	.57	0.38	0.05	8.12***
IQ	.00	0.00	0.03	0.00	.00	0.00	0.04	0.01	-.00	-0.00	0.04	-0.04
Sex[a]	-.09	-0.12	0.06	-1.92	-.07	-0.10	0.09	-1.09	-.11	-0.16	0.09	-1.85
SES[b]	.08	0.11	0.06	1.67	.07	0.09	0.07	1.24	.09	0.13	0.10	1.29
Mentor[c]	.02	0.03	0.12	0.26	-.16	-0.28	0.10	-2.74**	.02	0.03	0.12	0.25
Transition[d]	.10	0.14	0.13	1.05	---	---	---	---	---	---	---	---
Tor[c] × Transit[d]	-.23	-0.32	0.14	-2.28*	---	---	---	---	---	---	---	---
R-Square	.37				.34				.40			

Note. β = standardized multiple regression coefficient; b = unstandardized multiple regression coefficient; *SE* = standard error; Year 1 = baseline score for classroom engagement. All continuous predictor variables were entered as z-scores. [a]Sex: male = 1, female = 0; [b]SES: not economically disadvantaged = 1, economically disadvantaged = 0; [c]Mentor: present = 1, not present = 0; [d]Transition: recently made transition to middle school = 1; did not make the transition recently = 0. [e]MS = intermediate or middle school.
*p < .05, **p < .01, ***p < .001.

Learning and affective support. There was no statistically significant interaction observed between the levels of support and middle school transition on any academic outcomes.

CONCLUSION

Summary

The purpose of this study was to explore the prevalence and patterns of nonparental social support for elementary and middle school students, determine the effect of such support on students' academic achievement and academic outcomes, and investigate whether nonparental adult support plays a greater role during students' middle school transition. The results support the general conceptual theory that posited (a) nonparental social support is prevalent during early adolescent years, (b) the availability of natural mentors is associated with positive academic achievement, and (c) learning support and affective support are distinct constructs of nonparental adult support for young adolescents and exhibit additive and interactive effect on their academic outcomes. These findings were often qualified by sex and in some instances ethnicity. Effects did not differ by SES on any outcome variable. Furthermore, there was some support for the moderating effect of middle school transition; however, the effect was in a negative direction for students who have recently transitioned to middle school.

Availability of Natural Mentors

Consistent with past research on older adolescents which suggest that nonparental social support is a normative component of youth development (Beam et al., 2002), a large majority of young adolescents in the current study reported having a natural mentor. The current study also found that significant natural mentoring relationship was present in early adolescent years, as has been suggested by retrospective

studies which asked older adolescents and young adults to recall having such an adult (Cavell et al., 2002; DuBois & Silverthorn, 2005b). The finding that nonparental social support was reported by more girls than boys was also consistent with cross-sectional research on natural mentoring relationships (Blyth et al., 1982; Greenberger et al., 1998) as well as with extensive research on sex differences in social support and interpersonal relationships (e.g. Furman & Buhrmester, 1992).

The current study found that nonparental adult support was available for young adolescents regardless of their ethnic background. This finding is consistent with previous research that reported no racial or ethnic differences in the availability of natural mentors (Casey-Cannon et al., 2006; Greenberger et al., 1998). However, nonparental adult support has been reported to be limited for ethnic minority teen mothers (Rhodes et al., 1992; Rhodes et al., 1994). Taken together, these findings may suggest that nonparental social support is generally available to youths across different ethnic backgrounds but may be less available for ethnic minority youths with complicated or multiple risk factors.

Findings on the characteristics of natural mentors are also consistent with the literature (Blyth et al., 1982; Casey-Cannon et al., 2006; DuBois & Silverthorn, 2005b; Greenberger et al., 1998; Rhodes et al., 1992; Rhodes et al., 1994) with a large proportion of students reporting relatives as natural mentors. Similar to the findings reported by Greenberger and colleagues (1998), more Hispanic and African American youths nominated extended family members than Caucasian students did. Extensive research supports this finding that relatives play important roles in the lives of ethnic

minority youths (Harrison, Wilson, Pine, Chan, & Buriel, 1990; Hirsch et al., 2002; Kim & KcKenry, 1998; Wilson, 1989). Furthermore, youths most frequently nominated adults in helping profession as natural mentors, and nearly half of these adults were teachers. Research documents the greater effectiveness of adults in helping profession in formal mentoring programs (DuBois & Silverthorn, 2005b) and the important roles teachers play in children's lives (Hamre & Pianta, 2001; Pianta, Hamre, & Stuhlman, 2003).

Effects of Having a Natural Mentor

The current study extended previous research on nonparental social support by using a prospective design, by examining both standardized academic achievement and academic outcomes, and by using stronger covariates to control for baseline levels of functioning. For reading achievement, availability of natural mentors predicted Time 2 reading scores after controlling for Time 1 reading, cognitive ability, and demographic variables. This finding is especially noteworthy considering the stability observed in children's academic achievement after third grade (Miles & Stipek, 2006). This study is the first longitudinal study that found a positive effect of natural mentors on students' standardized measure of reading achievement.

For math achievement, a statistically significant effect was found only for female students, indicating a protective effect of nonparental adult support for female students (Gutman et al., 2003). *The Nation's Report Card* issued by the U.S. Department of Education identifies math as a domain in which female students are outperformed by male students on standardized measures (Lee, Grigg, & Dion, 2007) although the

differences are relatively small until the adolescent years (Gallagher & Kaufman, 2005). Even though girls typically receive higher report card grades in math (Duckworth & Seligman, 2006), the cultural stereotype that views math as a masculine domain persists (Hyde, Fennema, Ryan, Frost, & Hopp, 1990). Some researchers suggest that such stereotyping produces added pressure that interferes with test performance for female students (Hyde et al., 1990; Spencer, Steele, & Quinn, 1999). Furthermore, girls are reported to be more distressed about academic performance (Pomerantz, Altermatt, & Saxon, 2002) and school (Silverman, La Greca, & Wasserstein, 1995) than boys are. Wenz-Gross and colleagues (1997) suggest that social support moderates the influence of academic and emotional stress on youth outcomes. Current findings may provide additional support for resiliency theory (Masten et al., 1990; Resnick et al., 1997); the availability of a natural mentor may exhibit a positive effect on female students' math achievement because it protects them from the negative impact of math performance-related stress.

There was no statistically significant effect of the availability of natural mentors on male students' math achievement or on any outcomes related to students' academic beliefs and behaviors.

Effects of Learning and Affective Support

As hypothesized, students who reported having a natural mentor benefited from the provision of learning and affective support. The benefit varied by outcome, child's sex, and in some instances ethnicity. For achievement outcomes, a statistically significant effect was only found for male students' reading achievement, but in a

negative direction. This finding is difficult to interpret, and one can only speculate the processes that may have contributed to this surprising finding. One possible explanation may be that there are different threshold levels of support for boys and girls, and for male students nonparental adult support may interact uniquely with unmeasured constructs such as support from other sources, academic need for additional support, and other dimensions of support (e.g., support for autonomy). Taken together with research on multiple sources of social support (Demaray & Malecki, 2002a), the results may suggest that it is especially essential for boys to receive support from more than one source. Additionally, research on parental support suggests that sensitive support for autonomy from parents predicts elementary school boys', but not girls', reading and math achievement (National Institute of Child Health and Human Development Early Child Care Research Network, 2008). Neither support from other sources nor support for autonomy was measured in the present study. Also unmeasured was students' externalizing behavior problems. Externalizing behavior problems have been found to predict lack of progress in reading skills among middle-school male students, even when remedial assistance and support were provided starting in elementary school (Smart, Prior, Sanson, & Oberklaid, 2001). Another explanation may be that there are not only sex- but also grade-level differences in reading motivation and reading efficacy among middle-school students (Mucherah & Yoder, 2008). Mucherah and Yoder's research found that reading motivation and reading efficacy increased as students progressed in grade. As such, the negative effects found in the current study may be unique to the

children's current developmental stage and may be temporary. Further exploration of exact mechanism of change requires more time for children's development.

For the teacher-rated outcome (classroom engagement) for female students, there were main effects of both learning and affective support but in different directions. While affective support predicted a positive change in classroom engagement, learning support predicted a negative change from Time 1 to Time 2. This may be because female students who are less engaged in academic contexts elicit more learning support from natural mentors. A longitudinal study examining the effect of teacher behaviors suggests that child's level of classroom engagement impact teachers' interactions with the student and vice versa (Skinner & Belmont, 1993). The result also provides additional evidence for the divergent validity of learning and affective support.

The hypothesized interactive effects were found for student-reported outcomes (competence beliefs and school membership). In light of lack of statistically significant effect for the availability of natural mentors on student-reported outcomes, these results suggest that it is not enough to merely have a natural mentor; natural mentor must provide learning and affective support in order to affect students' academic attitudes and behaviors. These findings partially replicate previous research that quality of relationships with others impacts children's processes of internalization (Deci & Ryan, 1991) such as competence belief (Connell & Wellborn, 1991), commitment to school (Kenny, Blustein, Chaves, Grossman, & Gallagher, 2003) and academic behavior (Crosnoe & Elder, 2004). The results also indicate the effect is synergistic; the effect of one dimension of support (e.g., learning support) was intensified in the presence of the

other (e.g., affective support). These results are consistent with research on parent-child relationships that has found that the positive effects of setting clear limits and expectations for behavior as well as communication of firm expectations are enhanced in the context of an emotionally supportive parent-child relationship (Baumrind, 1967, 1968; Dumas, 1996; Kochanska, 1995).

For competence belief in reading and math, effects varied by sex. Extensive research documents sex differences in social support (Furman & Buhrmester, 1992) and competence belief (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Wigfield et al., 1997), favoring female students. This finding is consistent with cross-sectional research that found a statistically significant positive correlation between nonparental adult support and only female students' academic self-concepts (Cotterell, 1992). Furthermore, some researchers propose that girls are more vulnerable to internal distress associated with academic performance (Pomerantz et al., 2002). For female students in the current study, learning support and affective support may have protected them from such internal distress and enhanced their competence beliefs. These findings add to the literature that suggests social messages are more salient for early adolescent girls (Watt, 2004).

Effects of learning and affective support also varied by ethnicity for competence belief in reading. For African American students who reported having a natural mentor, there was no statistically significant effect of learning or affective support. For Caucasian students, affective support alone was predictive in change of competence belief in reading, whereas for Hispanic students learning support alone was predictive.

Ethnic differences in the source, type, and level of support (Gamble & Dalla, 1997; Kim & McKenry, 1998), academic competence belief (Kaminski, Shafer, Neumann, & Ramos, 2005; Twenge & Crocker, 2002), and reading performance (Lee, Grigg, & Donahue, 2007) may have contributed to these findings (Chapman, Turner, & Prochnow, 2000; Grolnick & Ryan, 1989; Wenz-Gross et al., 1997).

The main effect of learning support for Hispanic youths' competence belief in reading is particularly noteworthy, as there was no other outcome in the current study in which learning support exhibited main effect in the absence of statistically significant effect of affective support. Hispanic youths may have low confidence in reading (Twenge & Crocker, 2002) especially if they are not fully proficient in English or unfamiliar with the cultural concepts found in reading materials (DeBlassie & DeBlassie, 1996). As Sands and Plunkett (2005) suggest, support from significant others may be particularly important for Hispanic youths because the support protects them from cultural and linguistic barriers that they may experience. Furthermore, for Hispanic youths affective support may be generally more available from other sources (e.g., family), whereas learning support may be generally less available (Mindel, 1980). Thus, learning support provided by natural mentors may compensate for the limited availability of learning support from other sources for Hispanic youths.

In summary, the availability of natural mentors promoted children's academic achievement, whereas the provision of learning and affective support promoted academic psychological outcomes such as academic competence beliefs, classroom engagement, and school membership. These effects were often qualified by sex and in

some instances by ethnicity. Theoretically one would believe the effect on academic achievement is mediated by academic outcomes. The results of the current study did not provide support for such mechanisms of change. A longer longitudinal study is needed to delineate further the mechanisms by which natural mentors and the provision of their support promote children's academic achievement and academic outcomes.

Transition to Middle School

There was some support for the hypothesis that transition to middle school moderates the effects of nonparental adult support but the effects were in an unexpected direction. For students who have recently made the transition, the effect was statistically significant and negative on classroom engagement. This negative finding is contrary to the hypothesis, but consistent with some literature that documents increased psychological distress following transition to middle school (Chung et al., 1998; Crockett, Peterson, Graber, Shulenberg, & Ebata, 1989). Roeser and Eccles (1998) reported that children's school behavior declined following middle school transition when students perceived emphasis on ability and completion of school work from their teachers. It is possible that some adolescents may have perceived support from natural mentors as academic emphasis or pressure following middle school transition. No statistically significant interaction was observed between the provision of learning and affective support and middle school transition on any academic outcomes.

These results should be considered in light of sample characteristics in the present study. Although transition to middle school is most often associated with particular grade level, students transitioned to middle school at different grade levels in

the current study due to varying grade placement policies employed by different school districts. Transition to middle school was defined as making the transition between Time 1 and Time 2; the nontransition group consisted of students who stayed in elementary school at Time 1 and Time 2 as well as students who were in middle school at Time 1 and Time 2. Barber and Olsen (2004) found that students differed in their school performance and psychological functioning before, during, and after middle school transition. Grouping students who remained in elementary school with students who have been in middle school across two years may have been problematic. Although the present study statistically controlled for school-level dependency, the impact of statistically unaccounted factors related to middle school transition (e.g., grade level, school policy, etc.) remains unknown.

Implications

The current results generate several useful implications for formal mentoring programs, extracurricular activities, teacher training, and educational policy as they relate to academically at-risk youth. First, current results provided strong evidence that the availability of natural mentors promotes positive academic achievement. The results also demonstrated positive effects of both learning and affective support on children's academic outcomes. For academic outcomes (competence belief, engagement, and school belonging), the mere existence of a natural mentor was not enough to exert positive change. These results also provided evidence that learning support and affective support are distinct constructs of nonparental adult support and highlighted the importance of both types of support. Although such effects are often claimed as a basis

for providing formal mentors to children who may have limited access to natural mentors, there has been little empirical evidence for positive effect of natural mentors (DuBois et al., 2002). Furthermore, the current results provided valuable information on characteristics of children who benefited from natural mentoring relationships as well as on the dimensions of support children benefited from. Based on the finding that effects often varied by outcome and sex, and in some instances by ethnicity, formal mentoring programs may pay closer attention to the match between child characteristics (e.g., sex and ethnicity) and mentor or relationship characteristics (e.g., instructional, affectionate, or both) or mentoring organization goals (e.g., academic vs. affective focus). Additionally, given the continuous shortage of effective mentors (cf. DuBois & Karcher, 2005), these results may encourage formal mentoring programs to revisit program policies such as matching priority and mentor training.

Second, current results indicated that there were only a small proportion of children who did not report having a significant nonparental adult. Given the serious consequences found in the present study, participation in extracurricular activities such as after-school programs and out-of-school sports activities should be encouraged and made possible for such adolescents (Bartko & Eccles, 2003; Mahoney & Cairns, 1997). In particular, special effort should be paid to engage Hispanic students, as they were least likely to name a natural mentor involved in extracurricular activities.

Third, the indirect findings of the present study suggested the importance of support from teachers, as they are the adults in helping profession most available for the majority of youths. Greater effectiveness of adults in helping profession has been

documented in mentoring literature (DuBois & Silverthorn, 2005b). Although investigation of the impact of natural mentors in helping profession was outside the scope of this study, descriptive data revealed that adults in helping profession were most frequently nominated as natural mentors by study participants. Nearly half of these adults were teachers. Extensive research documents importance of teacher-student relationship (Hamre & Pianta, 2001; Pianta et al., 2003), especially during the time of transition (Hirsch & Rapkin, 1987; Silver, Measelle, Armstrong & Essex, 2005); yet, teachers may receive little training in ways to develop warm and caring relationships with their students (Shuell, 1996). Furthermore, there may be school-, district-, or even government-level policies that affect "staffing levels, configurations, and allocations of programs," constraining the teacher-student relationships (p. 170, Pianta, 1999). In a classical study of children's perceptions of social relationships, Furman and Buhrmester (1985) reported students received the least amounts of reliable alliance, affection, enhancement of worth, and intimacy from their teachers. Current findings provide additional support for interventions and policies designed to support teachers in developing relationships with academically at-risk students from diverse backgrounds.

Implications for Resiliency Research

The present study extends existing resiliency research demonstrating both promotive and protective effects of social support. According to Gutman et al. (2003), a positive main effect observed in regression equation is indicative of promotive effect of a predictor, while a statistically significant interaction effect between a predictor variable and risk factor is indicative of protective effect. Promotive effects were found for the

availability of natural mentors on students' reading achievement as well as learning and affective support on school membership. Protective effects were observed for female students on the availability of natural mentors on math achievement, learning and affective support on competence beliefs in reading and math, and affective support on engagement. Protective effects were also found for learning and affective support on competence belief in reading for Hispanic and Caucasian students, respectively. These findings extends previous research that found source of support influences whether social support exerts promotive or protective effect (Gutman et al., 2003), and may further suggest that the effects of social support also vary by the type of support, resiliency factor, and outcome.

The limited support for positive effects of nonparental adults support for male students may be related to the lack of information on family support in the current study. Researchers have found evidence that suggests sex as a risk factor that exhibits particularly negative impacts on boys' emotional and behavioral development in the presence of family discord (Rutter, 1987). According to Garmezy and colleagues (1984), effects of protective factors are sometimes conditional on the presence of a risk factor; i.e., effects may not be detectable in the absence of a risk factor. It is possible that our study sample may have come from more economically stable and less emotionally distressful homes. However, without information on family structure, family cohesiveness, or parent-child relationship, it was not possible to examine the presence of family discord among our study sample or investigate whether the presence or absence of family discord accounted for lack of statistically significant findings for

the male students. Furthermore, the results of the current study did not provide support for the indirect, mediating effects of nonparental social support. Examination of such indirect effects of nonparental adult support requires more data points (Kline, 2005).

Limitations and Future Directions

These results should be interpreted in light of several study limitations. First, the study was limited in examining a number of risk factors. Recent research has found the importance of examining multiple risk factors simultaneously when investigating the risk and resiliency in youth development (Gutman et al., 2003; Masten & Coatsworth, 1998; Wachs, 2000). It was outside the scope of this study to investigate the impact of multiple biological and psychosocial risk factors (Werner, 1990), including family discord, that may have impacted the study findings. Similarly, the design of the current study did not allow for exploration of potential nonlinear relations (e.g., curvilinear relationship) between nonparental adult support and risk factors. Such an examination may have provided further insight into hard-to-interpret results such as negative effect of learning support on female students' classroom engagement.

Similarly, the current study focused on one type of relationship with one nonparental adult. Design of the current study did not allow for an examination of other significant relationships such as with family or peers, nor did it allow children to nominate more than one significant adult. Since relationships occur in various settings and often overlap, the effect of support from significant relationships may be best investigated in the context of interconnected relationships and proximal and distal social structures. In particular, the current study did not investigate the effect of parental

support on youth outcomes. Research on teacher-student relationship and parental relationship suggests that support children draw from these two types of relationships interact in a complex manner (Crosnoe & Elder, 2004; Hughes, Cavell, & Jackson, 1999). For example, Crosnoe and Elder (2004) reported that a supportive relationship with a teacher exacerbated risk among older adolescents who reported emotional distance from their parents. Conversely, Hughes, Cavell, and Jackson (1999) found that a positive teacher-student relationship exerted a buffering effect for aggressive elementary school students who were at higher risk for less responsive and sensitive maternal care. These findings may suggest a need for exploration of context, child characteristics, and developmental stage in social support research; however, such an investigation was outside the scope of the current study. It is likely that nonparental social support also interacts delicately with parental support. Such information may have facilitated in clarification of the study findings and extended the study implications.

Furthermore, the study did not examine the influence of natural mentor characteristics (e.g., relationship type, occupation, age, etc.) or relationship characteristics (e.g., length of relationship, frequency of contact, shared activities, etc.). Formal mentoring literature suggests such factors play an important role in determining the mentoring effectiveness. For example, mentors in helping profession has been found to exert more positive effects, while short-term, inconsistent relationships have been found to have adverse impact on youth outcomes (DuBois et al., 2002). Investigation of mentor characteristics and relationship characteristics should provide greater

understanding of the effects of nonparental social support on early adolescents' academic achievement and academic outcomes.

The characteristics of study participants may impact the generalizability of the findings. The sample was drawn from students who were identified as academically at-risk based on their state-approved and district-administered measures of literacy at elementary school entry. Although such at-risk populations may be of particular interest to many mentoring programs, educators, policy makers, and researchers, the results may not generalize to more academically successful students. Furthermore, demographics of the study participants reveal that a large number of students had at least one adult in their homes who had a high school education or higher and had at least one adult in their homes who was employed full-time. Although more than 50% of study participants received free or reduced lunch (an indicator of SES level used in the current study), the study participants may have been sheltered somewhat from the effects of socioeconomic adversity. Additionally, as noted earlier, the grade at which students transitioned to middle school varied by school districts. This may have contributed to the inconsistent and surprising finding that middle school transition negatively moderated the effect of the availability of natural mentors on students' classroom engagement.

Lastly, as discussed earlier, because the current study is part of an on-going longitudinal study, the data regarding nonparental adult support was only available for the past two years. As such, the mechanisms that accounted for the observed effects of nonparental adult support were not fully clarified. It remains to be investigated whether unmeasured constructs such as support for autonomy or academic stress impact the effect of nonparental adult support. Also not investigated was whether support from natural mentors directly or indirectly exerts its effects on academic achievement and academic outcomes. Examination of such paths requires data from at least three data points (Kline, 2005). Future research should examine multiple constructs and analyze the paths that may be involved in the mechanism of change, using a longitudinal design that spans for a longer developmental period.

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APPENDIX A

Contrast Coding for Three Ethnic Groups

	Contrast 1	Contrast 2
African American	-1	-1
Hispanic	-1	1
Caucasian	2	0

APPENDIX B

Zero-order Correlations for Predictors for African American, Hispanic, and Caucasian (n = 353) Hypothesis 1: All study participants

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Reading	1.00												
2. Math	**.68**	1.00											
3. CB[a] Reading	**.26**	.06	1.00										
4. CB[a] Math	.02	**.24**	**.30**	1.00									
5. Engagement	**.25**	**.32**	.05	.10	1.00								
6. School Membership	.04	.04	**.31**	**.27**	.10	1.00							
1. Sex[b]	.00	.08	-.01	*.13*	**-.17**	-.05	1.00						
2. SES[c]	**.28**	**.25**	.03	-.01	.11	-.06	-.02	1.00					
7. IQ	**.32**	**.37**	.02	.07	**.21**	.05	.04	**.19**	1.00				
8. Mentor[d]	-.01	.01	.04	-.02	.02	.07	*-.13*	.02	-.04	1.00			
3. African American[e]	**-.33**	**-.29**	.07	.04	**-.32**	.05	-.04	**-.31**	**-.29**	.03	1.00		
4. Hispanic[f]	.04	.03	-.01	.02	**.20**	.09	.00	**-.31**	*.13*	-.04	---	1.00	
5. Caucasian[g]	**.26**	**.24**	-.05	-.05	.10	*-.14*	.05	**.60**	*.14*	.02	---	---	1.00

Note. Variables 1 through 6 were measured at Year 1. [a]CB = competence belief; [b]Sex: male = 1, female = 0; [c]SES: not economically disadvantaged = 1, economically disadvantaged = 0; [d]Mentor: present = 1, not present = 0; [e]African American: African American = 1, Hispanic or Caucasian = 0; [f]Hispanic: Hispanic = 1, African American or Caucasian = 0; [g]Caucasian: Caucasian = 1, African American or Hispanic = 0.
Bolded values are statistically significant at the $p < .01$ level.
Values in italics are statistically significant at the $p < .05$ level.

APPENDIX C

Zero-order Correlations for Predictors for African American, Hispanic, and Caucasian (n = 296) Hypothesis 2: Participants with natural mentors

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
6.	Reading	1.00													
7.	Math	**.66**	1.00												
8.	CB[a] Reading	**.24**	.04	1.00											
9.	CB[a] Math	.02	**.22**	**.30**	1.00										
10.	Engagement	**.26**	**.32**	.02	.03	1.00									
11.	School Membership	.02	.02	**.32**	**.25**	.11	1.00								
12.	Sex[b]	-.01	.08	.00	*.13*	*-.16*	-.08	1.00							
13.	SES[c]	**.32**	**.31**	.03	.01	*.15*	-.06	-.03	1.00						
14.	IQ	**.30**	**.34**	-.01	.06	**.22**	.07	.03	**.19**	1.00					
15.	Learning Support	**-.18**	**-.23**	**.18**	.06	*-.17*	**.20**	*-.13*	**-.32**	**-.17**	1.00				
16.	Affect Support	-.04	*-.13*	*.12*	-.05	-.10	*.13*	**-.19**	*-.12*	-.08	**.60**	1.00			
17.	African American[d]	**-.33**	**-.32**	*.13*	.07	**-.36**	.07	-.07	**-.33**	**-.30**	**.26**	*.15*	1.00		
18.	Hispanic[e]	.02	.00	-.05	-.03	*.18*	.08	.01	**-.31**	*.13*	**.18**	.02	---	1.00	
19.	Caucasian[f]	**.29**	**.30**	-.07	-.03	*.16*	*-.15*	.06	**.61**	*.15*	**-.42**	**-.16**	---	---	1.00

Note. Variables 1 through 6 were measured at Year 1. [a]CB = competence belief; [b]Sex: male = 1, female = 0; [c]SES: not economically disadvantaged = 1, economically disadvantaged = 0; [d]African American: African American = 1, Hispanic or Caucasian = 0; [e]Hispanic: Hispanic = 1, African American or Caucasian = 0; [f]Caucasian: Caucasian = 1, African American or Hispanic = 0.
Bolded values are statistically significant at the $p < .01$ level.
Values in italics are statistically significant at the $p < .05$ level.

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